



**DIFFER**

LISTINGS & OUTPUT 2021

# LISTINGS & OUTPUT

## **PREFACE**

As of 2021, DIFFER stops publishing an annual report with the year's highlights about our people, research, facilities, and events. These can be found on our website and in our newsletter EXPLORE.

We do, however, continue to list the most important output of our institute. In years past, we published it as an appendix to the annual report. Now, it is bundled in this document called DIFFER's Listings & Output 2021.

This document provides an overview of DIFFER's output. It includes listings of media appearances, PhD theses, MSc and BSc theses, and internship reports. It lists our publications in peer-reviewed scientific journals, other journals, conference proceedings, and books. And it mentions those who have guest lectured at conferences, meetings, and seminars or presented posters or given other presentations. It also sums up awards and positions (including editorships).

The lists are categorized along our two research lines: fusion energy and solar fuels.

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## 1. Output Fusion Energy

### 1.1 MSc theses, BSc theses and Master internship reports: 18

1. B.F.H. van den Boorn, *Sensitivity analysis of the heat transport coefficient estimation in fusion reactors and the identifiability under noisy conditions*, Master thesis Eindhoven University of Technology, 2021/02/12, Mentor: R.J.R. van Kampen, M. van Berkel, M.R. de Baar
2. T.O.S.J. Bosman, *Model-based design and validation of an electron density profile controller in ITER. Towards model-based electron density profile control in ITER*, Master thesis Eindhoven University of Technology, 2021/01/13, Mentor: M.R. de Baar, M. van Berkel
3. S. Bouwmans, *Polarization camera based coherence imaging spectroscopy diagnostic for MANTIS to measure ion dynamics in TCV during divertor detachment*, Master thesis Eindhoven University of Technology, 2021/08/31, Mentor: A. Perek
4. L. Ceelen, *Real-time target heat flux estimation in detached divertor plasmas*, Master Internship report Eindhoven University of Technology, 2021/12/01, Mentor: J.T.W. Koenders, M. van Berkel, M.R. de Baar
5. G.L. Derks, *Developing a physics-based dynamic model of the divertor for control purposes*, Master thesis Eindhoven University of Technology, 2021/12/06, Mentor: J.T.W. Koenders, M. van Berkel, M.R. de Baar
6. J.P.K.W. Frankemölle, *Statics and dynamics of detachment in 1D*, Master thesis Eindhoven University of Technology, 2021/01/31, Mentor: E. Westerhof, H.J. de Blank
7. P. van de Giessen, *Analysis of the electron cyclotron heating and current drive system in the ST-F1 spherical tokamak*, Master thesis Eindhoven University of Technology, 2021/03/31, Mentor: H.J. de Blank
8. B. Kool, *Improvements to the real-time NII-tracking algorithm and control system integration in TCV*, Master Internship report Eindhoven University of Technology, 2021/01/31, Mentor: J.T.W. Koenders, M. van Berkel, M.R. de Baar
9. A.M.S. Langelaan, *Inter-code benchmark between free boundary plasma equilibrium solvers FGS/FGE and FEEQS*, Master thesis Eindhoven University of Technology, 2021/04/30, Mentor: M. van Berkel, M.R. de Baar
10. J. Manders, *The development of an experimental testbed for the dynamical analysis and control of piezoelectric gas valves*, Master thesis Eindhoven University of Technology, 2021/01/04, Mentor: M.R. de Baar, M. van Berkel, R.J.R. van Kampen
11. S. Marechal, *Expanding the QuaLiKiz Neural Network surrogate model with generalized ion particle transport coefficient networks*, Master thesis Eindhoven University of Technology, 2021/07/29, Mentor: A. Ho, J. Citrin
12. D.M. Nieuwenhuizen, *Applications of deep generative models to tokamak nuclear fusion*, Master thesis Eindhoven University of Technology, 03/2021, Mentor: J. Citrin, K.L. van de Plassche
13. D.M. Nieuwenhuizen, *Modeling nuclear fusion reactors using variational auto-encoders*, Master thesis Eindhoven University of Technology, 02/2021, Mentor: J. Citrin, K.L. van de Plassche
14. J.H. Slief, *Estimation of ECH deposition profiles in DIII-D plasmas based on experimental observations*, Master thesis Eindhoven University of Technology, 2021/07/05, Mentor: M.R. de Baar, M. van Berkel
15. A. Sona, *Electron adiabaticity as a characteristic of plasma instabilities in varying magnetic geometries*, Master thesis Eindhoven University of Technology, 2021/07/01, Mentor: M.J. Pueschel
16. M. Smedberg, *Reducing the QuaLiKiz Neural-Network 10-dimensional dataset: sampling and correlation techniques*, Master thesis Eindhoven University of Technology, 2021, Mentor: J. Citrin
17. J. de Vries, *Closed-form solutions of inverse 2D- and coupled transport problems. Optimization of the equation error through basis function parameterization*, Master thesis Eindhoven University of Technology, 2021/05/12, Mentor: M.R. de Baar, M. van Berkel, R.J.R. van Kampen
18. A.H.J. Waldus, *System identification and high performance controller design for piezoelectric gas valves*, Master thesis Eindhoven University of Technology, 2021/12/07, Mentor: M.R. de Baar, T.O.S.J. Bosman, M. van Berkel

## 1.2 PhD theses: 6

1. A. Ho, *Development of neural networks towards predict-first plasma modelling*, PhD thesis at the Eindhoven University of Technology, 2021/03/17, Promotors: N.J. Lopes Cardozo, M.R. de Baar; Co-promotor: J. Citrin
2. Y. Li, *Thermo-mechanical behavior of tungsten under fusion-relevant hydrogen plasma loads*, PhD thesis at the Eindhoven University of Technology, 2021/06/18, Promotors: M.G.D. Geers, K. Verbeken; Co-promotors: T.W. Morgan; J.A.W. van Dommelen
3. M. Marin, *Integrated modelling of multiple-ion tokamak discharges: validation and extrapolation*, PhD thesis at the Eindhoven University of Technology, 2021/09/01, Promotors: N.J. Lopes Cardozo, M.R. de Baar; Co-promotor: J. Citrin
4. C. Onwudinanti, *On hydrogen penetration into ruthenium; the role of tin in blistering of EUV mirrors*, PhD thesis at the Eindhoven University of Technology, 2021/09/08, Promotors: J.M.V.A. Koelman, G. Brocks; Co-promotor: S.X. Tao
5. W. Ou, *Liquid metal as the wall material of fusion reactors: deuterium retention and surface stability*, PhD thesis at the Eindhoven University of Technology, 2021/07/07, Promotors: N.J. Lopes Cardozo, T.W. Morgan
6. T. Ravensbergen, *Advanced methods in control of the core density and divertor detachment in nuclear fusion devices*, PhD thesis at the Eindhoven University of Technology, 2021/02/04, Promotor: M.R. de Baar; Co-promotor: M. van Berkel

## 1.3 Publications in peer-reviewed scientific journals: 69

1. G.R.A. Akkermans, I.G.J. Classen, H.J. van der Meiden, J. van den Berg, J.W.M. Vernimmen, *The role of target closure in detachment in Magnum-PSI*, Phys. Plasmas 28 (2021) 092513
2. J.S. Allcock, S.A. Silburn, R. Sharples, J.R. Harrison, N.J. Conway, J.W.M. Vernimmen, *2D measurements of plasma electron density using coherence imaging with a pixelated phase mask*, Rev. Sci. Instrum. 92 (2021) 073506
3. F.J. Artola, C.R. Sovinec, S.C. Jardin, M. Hoelzl, I. Krebs, C. Clauser, *3D simulations of vertical displacement events in tokamaks: A benchmark of M3D-C 1, NIMROD, and JOREK*, Phys. Plasmas 28 (2021) 052511
4. J. van den Berg, H.J. van der Meiden, I.G.J. Classen, J.W.M. Vernimmen, Y. Li, J. Scholten, S. Brons, G.J. van Rooij, *Thermalized collisional pre-sheath detected in dense plasma with coherent and incoherent Thomson scattering*, Nucl. Fusion 61 (2021) 096007
5. J. van den Berg, I.G.J. Classen, H.J. van der Meiden, J.W.M. Vernimmen, S. Brons, G.J. van Rooij, *Inducing thermionic emission from lanthanum hexaboride probes in Magnum-PSI*, Nucl. Mater. Energy 29 (2021) 101097
6. T.O.S.J. Bosman, M. van Berkel, M.R. de Baar, *Model-based electron density profile estimation and control, applied to ITER*, J. Phys. Commun. 54 (2021) 115015
7. T.O.S.J. Bosman, O. Kudlacek, E. Fable, M. van Berkel, F. Felici, A. Bock, T. Luda, M.R. de Baar, ASDEX Upgrade team, *Kalman filter density reconstruction in ICRH discharges on ASDEX upgrade*, Fusion Eng. Des. 170 (2021) 112510
8. I. Casiraghi, P. Mantica, F. Köchl, R. Ambrosino, B. Baiocchi, A. Castaldo, J. Citrin, M. Dicorato, L. Frassinetti, A. Mariani, P. Vincenzi, P. Agostinetti, L. Aucone, L. Balbinot, S. Ceccuzzi, L. Figini, G. Granucci, P. Innocente, T.J. Johnson, H. Nystrom, M. Valisa, *First-principle based multi-channel integrated modelling in support to the design of the Divertor Tokamak Test facility*, Nucl. Fusion 61 (2021) 116068
9. R. Chandra, H.J. de Blank, P. Diomedede, H.J.N. van Eck, H.J. van der Meiden, T.W. Morgan, J.W.M. Vernimmen, E. Westerhof, *B2.5-Eunomia simulations of Magnum-PSI detachment experiments: I. Quantitative comparisons with experimental measurements*, Plasma Phys. Control. Fusion 63 (2021) 095006
10. Z. Chen, Y. Li, L. Cheng, Z. Wang, Y. Lian, X. Liu, F. Feng, J. Wang, Y. Tan, T.W. Morgan, G.H. Lu, X. Ye, B. Yan, J. Song, M. Xu, X.R. Duan, *Recent progress of thick tungsten coating prepared by chemical vapor deposition as the plasma-facing material*, Nucl. Fusion 61 (2021) 126024

11. A. Dinklage, G. Fuchert, R.C. Wolf, A. Alonso, T. Andreeva, C. Beidler, M. de Baar, Y. Gao, J. Geiger, M. Jakubowski, H.P. Laqua, N.B. Marushchenko, U. Neuner, N. Pablant, A. Pavone, K. Rahbarnia, J. Schmitt, H.M. Smith, T. Stange, Y. Turkin, W7-X Team, *Validation of theory-based models for the control of plasma currents in W7-X divertor plasmas*, Nucl. Fusion 61 (2021) 126022
12. V. Dwivedi, A. Marín-Roldan, J. Karhunen, P. Paris, I. Jogi, C. Porosnicu, C. Lungu, H.J. van der Meiden, A. Hakola, P. Veis, *CF-LIBS quantification and depth profile analysis of Be coating mixed layers*, Nucl. Mater. Energy 27 (2021) 100990
13. D. Dyubo, J. Gonzalez Munoz, O. Tsybin, L. Conde, *Charge transport characterization of the alternative low power hybrid ion engine (alphie) with particle-in-cell simulations*, Phys. Plasmas 28 (2021) 103509
14. X. Feng, A. Calcines, R. Sharples, B. Lipschultz, A. Perek, W.A.J. Vijvers, J.R. Harrison, J.S. Allcock, Y. Andrebe, B.P. Duval, R.T. Mumgaard, MAST-U Team, EUROfusion MST1 Team, *Development of an 11-channel multi wavelength imaging diagnostic for divertor plasmas in MAST Upgrade*, Rev. Sci. Instrum. 92 (2021) 063510
15. O. Fevrier, H. Reimerdes, C. Theiler, D. Brida, C. Colandrea, H. de Oliveira, B.P. Duval, D. Galassi, S. Gorno, A. Perek, S. Henderson, M. Komm, B. Labit, B. Linehan, L. Martinelli, H. Raj, H. Sheikh, C.K. Tsui, M. Wensing, TCV team, EUROfusion MST1 Team, *Divertor closure effects on the TCV boundary plasma*, Nucl. Mater. Energy 27 (2021) 100977
16. O. Fevrier, C. Theiler, S. Coda, C. Colandrea, H. de Oliveira, B.P. Duval, S. Gorno, B. Labit, B. Linehan, A. Perek, R. Maurizio, H. Reimerdes, C. Wüthrich, TCV team, *Detachment in conventional and advanced double-null plasmas in TCV*, Nucl. Fusion 61 (2021) 116064
17. A.E. Fraser, P.W. Terry, E.G. Zweibel, M.J. Pueschel, J.M. Schroeder, *The impact of magnetic fields on momentum transport and saturation of shear-flow instability by stable modes*, Phys. Plasmas 28 (2021) 022309
18. J. Fu, I.M. Richardson, M.J.M. Hermans, *Microstructure study of pulsed laser beam welded oxide dispersion-strengthened (Ods) eurofer steel*, Micromachines 12 (2021) 629
19. J. Fu, T.P. Davis, I.M. Richardson, M.J.M. Hermans, *Characterisation of the influence of vanadium and tantalum on yttrium-based nano-oxides in ODS Eurofer steel*, Mater. Charact. 175 (2021) 111072
20. D.R. Hatch, M. Kotschenreuther, S. Mahajan, M.J. Pueschel, C. Michoski, G. Merlo, E. Hassan, A.R. Field, L. Frassinetti, C. Giroud, J.C. Hillesheim, C.F. Maggi, C. Perez von Thun, C.M. Roach, S. Saarelma, D. Jarema, F. Jenko, JET Contributors, *Microtearing modes as the source of magnetic fluctuations in the JET pedestal*, Nucl. Fusion 61 (2021) 036015
21. P.W. Hatfield, J.A. Gaffney, G.J. Anderson, S. Ali, L. Antonelli, S. Basegmez du Pree, J. Citrin, M. Fajardo, P. Knapp, B. Kettle, B. Kustowski, M.J. MacDonald, D. Mariscal, M.E. Martin, T. Nagayama, C.A.J. Palmer, J.L. Peterson, S. Rose, J.J. Ruby, C. Shneider, M.J.V. Streeter, W. Trickey, B. Williams, *The data-driven future of high-energy-density physics*, Nature 593 (2021) 351-361
22. L.F. He, M. Khafizov, C. Jiang, B. Tyburska-Pueschel, B.J. Jaques, P.Y. Xiu, P. Xu, M.K. Meyer, K. Sridharan, D.P. Butt, *Phase and defect evolution in uranium-nitrogen-oxygen system under irradiation*, Acta Mater. 208 (2021) 116778
23. M. He, C. Onwudinanti, Y. Zheng, X.M. Wu, Z.X. Zhang, S.X. Tao, *Ab initio study of metal carbide hydrides in 2.25Cr1Mo0.25V steel*, Phys. Chem. Chem. Phys. 23 (2021) 5199-5206, Groen OA
24. A. Ho, J. Citrin, C. Bourdelle, Y. Camenen, F.J. Casson, K.L. van de Plassche, H. Weisen, JET Contributors, *Neural network surrogate of QuaLiKiz using JET experimental data to populate training space*, Phys. Plasmas 28 (2021) 032305
25. M. Hoelzl, G.T.A. Huijsmans, S.J.P. Pamela, M. Bécoulet, E. Nardon, F.J. Artola, B. Nkongsa, C.V. Atanasiu, I. Krebs, E. Westerhof, V. Bandaru, A. Bhole, D. Bonfiglio, A. Cathey, O. Czarny, A. Dvornova, T. Fehér, A. Fil, E. Franck, S. Futatani, M. Gruca, H. Guillard, J.W. Haverkort, I. Holod, D. Hu, S.K. Kim, S.Q. Korving, L. Kos, L. Kripner, G. Latu, F. Liu, P. Merkel, D. Meshcheriakov, V. Mitterauer, S. Mochalsky, J.A. Morales, R. Nies, N. Nikulsin, F. Orain, D. Penko, J. Pratt, R. Ramasamy, P. Ramet, C. Reux, N. Schwarz, P. Singh Verma, S.F. Smith, C. Sommariva, E. Strumberger, D.C. vanVugt, M. Verbeek, F. Wieschollek, J. Zielinski, *The JOREK non-linear extended MHD code and*

- applications to large-scale instabilities and their control in magnetically confined fusion plasmas*, Nucl. Fusion 61 (2021) 065001
26. F. Jaulmes, G. Zaditskiy, K. Bogar, M. Imrisek, J. Hromadka, S.Y. F. Cats, J. Varju, M. Komm, R. Panek, *Modelling of charge-exchange induced NBI losses in the COMPASS upgrade tokamak*, Nucl. Fusion 61 (2021) 046012
  27. I. Jogi, P. Paris, K. Piip, J. Ristkok, R. Talviste, H.M. Piirsoo, A. Tamm, E. Grigore, B. Tyburska-Pueschel, H.J. van der Meiden, A. Hakola, *LIBS applicability for investigation of re-deposition and fuel retention in tungsten coatings exposed to pure and nitrogen-mixed deuterium plasmas of Magnum-PSI*, Phys. Scr. 96 (2021) 114010
  28. I. Jogi, P. Paris, M. Laan, M. Kozlova, H. Mändar, M. Passoni, D. Dellasega, A. Hakola, H.J. van der Meiden, *LIBS study of ITER relevant tungsten-oxygen coatings exposed to deuterium plasma in Magnum-PSI*, J. Nucl. Mater. 544 (2021) 152660
  29. P.L. Joostens, E. Westerhof, *Topology of the warm plasma dispersion relation at the second Harmonic Electron Cyclotron Resonance Layer*, Phys. Plasmas 28 (2021) 012507
  30. R.J.R. van Kampen, A. Das, S. Weiland, M. van Berkel, *A closed-form solution to estimate spatially varying parameters in heat and mass transport*, IEEE Control Syst. Lett. 5 (2021) 1681-1686
  31. E. Lang, A. Kapat, T.W. Morgan, J.P. Allain, *High flux helium irradiation of dispersion-strengthened tungsten alloys and effects of heavy metal impurity layer deposition*, J. Nucl. Mater. 544 (2021) 152672
  32. S. Kajita, D. Nishijima, K. Fujii, G.R.A. Akkermans, H.J. van der Meiden, *Application of multiple regression for sensitivity analysis of helium line emissions to the electron density and temperature in Magnum-PSI*, Plasma Phys. Control. Fusion 63 (2021) 055018
  33. S. Kajita, T. Morgan, H. Tanaka, Y. Hayashi, N. Yoshida, D. Nagata, J. Vernimmen, S.Y. Feng, R. Zhang, N. Ohno, *Accelerated/reduced growth of tungsten fuzz by deposition of metals*, J. Nucl. Mater. 548 (2021) 152844
  34. J. Leland, S. Elmore, A. Kirk, H.J. van der Meiden, J. Scholten, S. Y. Allan, J.W. Bradley, *Angular dependence measurements of Magnum-PSI plasmas using MAST-U angled-tip Langmuir probes*, Nucl. Mater. Energy 27 (2021) 100954
  35. P.Y. Li, P.W. Terry, G.G. Whelan, M.J. Pueschel, *Saturation physics of threshold heat-flux reduction*, Phys. Plasmas 28 (2021) 102507
  36. Y. Li, T.W. Morgan, T. Vermeij, J.W.M. Vernimmen, T. Loewenhoff, J.P. M. Hoefnagels, J.A. W. van Dommelen, M. Wirtz, G. De Temmerman, K. Verbeken, M.G.D. Geers, *Recrystallization-mediated crack initiation in tungsten under simultaneous high-flux hydrogen plasma loads and high-cycle transient heating*, Nucl. Fusion 61 (2021) 046018
  37. Y. Li, T.W. Morgan, J. van den Berg, J.W. Genuit, G. De Temmerman, J.P.M. Hoefnagels, J.A.W. van Dommelen, K. Verbeken, M.G.D. Geers, *Power deposition behavior of high-density transient hydrogen plasma on tungsten in Magnum-PSI*, Plasma Phys. Control. Fusion 63 (2021) 085016
  38. A. Litnovsky, F. Klein, X. Tan, J. Ertmer, J. W. Coenen, C. Linsmeier, J. Gonzalez-Julian, M. Bram, I. Povstugar, T.W. Morgan, Y. Gasparyan, A. Suchkov, D. Bachurina, D. Nguyen-Manh, M. Gilbert, D. Sobieraj, J. Wrobel, E. Tejado, J. Matejicek, H. Zoz, H.U. Benz, P. Bittner, A. Reuban, *Advanced self-passivating alloys for an application under extreme conditions*, Met. 11 (2021) 1255
  39. A. Mariani, P. Mantica, I. Casiraghi, J. Citrin, T. Görler, G.M. Staebler, EUROfusion JET1 Contributors, *Benchmark of quasi-linear models against gyrokinetic single scale simulations in deuterium and tritium plasmas for a JET high beta hybrid discharge*, Nucl. Fusion 61 (2021) 066032
  40. M. Marin, J. Citrin, L. Garzotti, M. Valovic, C. Bourdelle, Y. Camenen, F.J. Casson, A. Ho, F. Koechl, M. Maslov, *Multiple-isotope pellet cycles captured by turbulent transport modelling in the JET tokamak*, Nucl. Fusion 61 (2021) 036042
  41. A. Marín-Roldan, V. Dwivedi, M. Veis, S. Atikukke, H.J. van der Meiden, M. Drzik, P. Veis, *Quantification of hydrogen isotopes by CF-LIBS in a W-based material (WZr) at atmospheric pressure: from ns towards ps*, Phys. Scr. 96 (2021) 124061

42. I.J. McKinney, M.J. Pueschel, B.J. Faber, C.C. Hegna, A. Ishizawa, P.W. Terry, *Kinetic ballooning mode turbulence in low-average-magnetic-shear equilibria*, J. Plasma Phys. 87 (2021) 905870311
43. H.J. van der Meiden, S. Almaguer, J. Butikova, V. Dwivedi, P. Gasior, W. Gromelski, A. Hakola, X. Jiang, I. Jogi, J. Karhunen, M. Kubkowska, M. Laan, G. Maddaluno, A. Marín-Roldan, P. Paris, K. Piip, M. Pisarcik, G. Sergienko, M. Veis, P. Veis, S. Brezinsek, EUROfusion WP PFC Team, *Monitoring of tritium and impurities in the first wall of fusion devices using a LIBS based diagnostic*, Nucl. Fusion 61 (2021) 125001
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45. T.W. Morgan, Y. Li, M. Balden, S. Brezinsek, G. De Temmerman, *Combined high fluence and high cycle number transient loading of ITER-like monoblocks in Magnum-PSI*, Nucl. Fusion 61 (2021) 116045
46. S. Van Mulders, F. Felici, O. Sauter, J. Citrin, A. Ho, M. Marin, K.L. van de Plassche, *Rapid optimization of stationary tokamak plasmas in RAPTOR: demonstration for the ITER hybrid scenario with neural network surrogate transport model QLKNN*, Nucl. Fusion 61 (2021) 086019
47. C. Onwudinanti, G. Brocks, J.M.V.A. Koelman, T.W. Morgan, S.X. Tao, *Tin deposition on ruthenium and its influence on blistering in multi-layer mirrors*, Phys. Chem. Chem. Phys. 23 (2021) 13878-13884
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51. M.J. Pueschel, P.Y. Li, P.W. Terry, *Predicting the critical gradient of ITG turbulence in fusion plasmas*, Nucl. Fusion 61 (2021) 054003
52. T. Ravensbergen, M. van Berkel, A. Perek, C. Galperti, B.P. Duval, O. Fevrier, R.J.R. van Kampen, F. Felici, J.T. Lammers, C. Theiler, J. Schoukens, B. Linehan, M. Komm, S. Henderson, D. Brida, M.R. de Baar, *Real-time feedback control of the impurity emission front in tokamak divertor plasmas*, Nat. Commun. 12 (2021) 1105
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56. F. Romano, P. Rindt, J. Scholten, Y. Hayashi, T.W. Morgan, *Effect of lithium vapour shielding on hydrogen plasma parameters*, Phys. Scr. 96 (2021) 125626
57. G.D. Rossi, T.A. Carter, B. Seo, J. Robertson, M.J. Pueschel, P.W. Terry, *Electromagnetic turbulence in increased  $\beta$  plasmas in the Large Plasma Device*, J. Plasma Phys. 87 (2021) 905870401
58. V. Shah, J.T. S. Beune, Y. Li, T. Loewenhoff, M. Wirtz, T.W. Morgan, J.A.W. van Dommelen, *Recrystallization behaviour of high-flux hydrogen plasma exposed tungsten*, J. Nucl. Mater. 545 (2021) 152748
59. J. Smoniewski, E. Sanchez, I. Calvo, M.J. Pueschel, J.N. Talmadge, *Comparison of local and global gyrokinetic calculations of collisionless zonal flow damping in quasi-symmetric stellarators*, Phys. Plasmas 28 (2021) 042503



60. C.D. Stephens, X. Garbet, J. Citrin, C. Bourdelle, K.L. van de Plassche, F. Jenko, *Quasilinear gyrokinetic theory: a derivation of QuaLiKiz*, J. Plasma Phys. 87 (2021) 905870409
61. P.W. Terry, P.Y. Li, M.J. Pueschel, G.G. Whelan, *Threshold heat-flux reduction by near-resonant energy transfer*, Phys. Rev. Lett. 126 (2021) 025004
62. K. Verhaegh, B. Lipschultz, J. Harrison, B. Duval, A. Fil, M. Wensing, C. Bowman, D.S. Gahle, A.S. Kukushkin, A. Perek, D. Moulton, A. Pshenov, F. Federici, O. Fevrier, O. Myatra, A.J. Smolders, C. Theiler, *The role of plasma-molecule interactions on power and particle balance during detachment on the TCV tokamak*, Nucl. Fusion 61 (2021) 106014
63. K. Verhaegh, B. Lipschultz, C. Bowman, B.P. Duval, U. Fantz, A. Fil, J.R. Harrison, D. Moulton, O. Myatra, A. Perek, D. Wunderlich, F. Federici, D.S. Gahle, M. Wensing, TCV team, EUROfusion MST1 Team, *A novel hydrogenic spectroscopic technique for inferring the role of plasma-molecule interaction on power and particle balance during detached conditions*, Plasma Phys. Control. Fusion 63 (2021) 035018
64. K. Verhaegh, B. Lipschultz, J. Harrison, B. Duval, C. Bowman, A. Fil, D.S. Gahle, A. Perek, D. Moulton, O. Myatra, C. Theiler, M. Wensing, MST1 Team, TCV team, *A study of the influence of plasma-molecule interactions on particle balance during detachment*, Nucl. Mater. Energy 26 (2021) 100922
65. M. Wensing, H. Reimerdes, O. Fevrier, C. Colandrea, L. Martinelli, K. Verhaegh, F. Bagnato, P. Blanchard, B. Vincent, A. Perek, S. Gorno, H. de Oliveira, C. Theiler, B.P. Duval, C.K. Tsui, M. Baquero-Ruiz, M. Wischmeier, TCV team, MST1 Team, *SOLPS-ITER validation with TCV L-mode discharges*, Phys. Plasmas 28 (2021) 082508
66. T.A. Wijkamp, A. Perek, J. Decker, B.P. Duval, M. Hoppe, G. Papp, U. Sheikh, I.G.J. Classen, R.J.E. Jaspers, TCV team, EUROfusion MST1 Team, *Tomographic reconstruction of the runaway distribution function in TCV using multispectral synchrotron images*, Nucl. Fusion 61 (2021) 046044
67. P.Y. Xiu, M. Jin, K. Bawane, B. Tyburska-Pueschel, B.J. Jaques, K.G. Field, J.J. Giglio, L.F. He, *Dislocation loops in proton irradiated uranium-nitrogen-oxygen system*, J. Nucl. Mater. 557 (2021) 153244
68. M. Yoshikawa, J. Kohagura, N. Ezumi, T. Iijima, K. Nojiri, A. Terakado, Y. Nakashima, T. Kariya, T. Numakura, H.J. van der Meiden, M. Hirata, R. Minami, M. Sakamoto, M. Ichimura, M.S. Islam, Y. Shima, R. Yasuhara, I. Yamada, H. Funaba, T. Minami, N. Kenmochi, D. Kuwahara, *Study of detached plasma profile in the divertor simulation experimental module of tandem mirror GAMMA 10/PDX*, AIP Adv. 11 (2021) 125231
69. H. Zohm, F. Militello, T.W. Morgan, W. Morris, H. Reimerdes, M. Siccinio, *The EU strategy for solving the DEMO exhaust problem*, Fusion Eng. Des. 166 (2021) 112307

#### 1.4 Publications in other journals and conference proceedings: 8

1. T. Beernaert, P. Etman, M. De Bock, I. Classen, M. de Baar, *Tracing the emergence of design problems and their impacts on the complexity of engineering solutions*, Proceedings International Conference on Engineering Design (ICED21) 1 (2021) 3229-3238
2. A. Bertagnoli, M. van Berkel, U. Schneidewind, R.J.R. van Kampen, S. Krause, A. Tranmer, T. Luce, D. Tonina, *Groundwater-surface water exchange: a new graphical user interface for temperature time-series analysis*, EGU General Assembly 2021, online, 19–30 Apr 2021 Proceedings (2021) EGU21-9311, Session HS10.9
3. D. Dyubo, J. Gonzalez Munoz, O. Tsybin, L. Conde, *Plasma thrusters for in-space propulsion; new trends and physical limitations*, Springer Proceedings in Physics, Proceedings of the YETI 2020 255 (2021) 55-64
4. F. Felici, T.C. Blanken, T.O.S.J. Bosman, F. Carpanese, C. Galperti, M. Kong, A. Merle, J. Moret, S. Van Mulders, A. Pau, O. Sauter, N.M.T. Vu, R. Fischer, L. Giannone, O. Kudlacek, M. Maraschek, E. Poli, M. Reich, B. Sieglin, W. Treutterer, M. Weiland, N. Rispoli, C. Sozzi, TCV team, EUROfusion MST1 Team, ASDEX Upgrade team, *Integrated plasma state reconstruction, off-normal event handling and control with application to TCV and ASDEX Upgrade*, Proceedings 28th IAEA Fusion energy conference (FEC 2020) (2021) 1352

5. R.J.R. van Kampen, A. Das, S. Weiland, M. van Berkel, *A linear least squares approach to estimate space-dependent parameters in heat and mass transport*, Book of Abstracts 40th Benelux Meeting on Systems and Control (2021) 68
6. R.J.R. van Kampen, A. Das, S. Weiland, M. van Berkel, *A closed-form solution to estimate spatially varying parameters in heat and mass transport*, Proceedings of the American Control Conference 2021 (2021) 286-291
7. J.T.W. Koenders, *Towards model-based control of divertor detachment*, Book of Abstracts 40th Benelux Meeting on Systems and Control (2021) 40
8. U. Schneidewind, S. Folegot, M. van Berkel, A. Bertagnoli, R.J.R. van Kampen, T. Luce, D. Tonina, S. Krause, *Quantifying vertical streambed fluxes around woody structures using high-resolution streambed temperature measurements*, EGU General Assembly 2021, online, 19–30 Apr 2021, Proceedings (2021) EGU21-9228, Session HS10.9

### 1.5 Professional publications: 1

1. J. Koenders, *Actief schild tegen de hitte van een fusiereactor. (Active shield against the heat of a fusion reactor)*, NEVAC Blad 59 (2021) p.6-10

### 1.6 Invited lectures at conferences and meetings: 22

1. 24<sup>th</sup> PSI Conference 2020, 2021/01/25-2021/01/29, Jeju, Korea, T.W. Morgan, Y. Li, M. Balden, S. Brezinsek, G. De Temmerman, *Combined high fluence and high cycle number transient loading of ITER-like monoblocks in Magnum-PSI*, 16-WO16(I)
2. 24<sup>th</sup> PSI Conference 2020, 2021/01/25-2021/01/29, Jeju, Korea, K. Verhaegh, B. Lipschultz, B.P. Duval, B. Dudson, A. Fil, O. Fevrier, D.S. Gahle, A. Perek, J.R. Harrison, D. Moulton, *The role of plasma-atom/molecule interactions on power, particle and momentum balance during detachment*, 17-TI17(F)
3. 22<sup>nd</sup> US Transport Task Force Workshop 2021, 2021/04/19-2021/04/23, Online, USA, A. Ho, J. Citrin, *JET ramp-up integrated modelling accelerated by QualiKiz neural network and automated workflows*
4. 22<sup>nd</sup> US Transport Task Force Workshop 2021, 2021/04/19-2021/04/23, Online, USA, M. Hamed, M.J. Poeschel, J. Citrin, M. Muraglia, X. Garbet, Y. Camenen, *Microtearing turbulence and reduced transport model building in H-mode plasmas*
5. 22<sup>nd</sup> US Transport Task Force Workshop 2021, 2021/04/19-2021/04/23, Online, USA, I.J. McKinney, M.J. Poeschel, C.C. Hegna, B.J. Faber, A. Ishizawa, P.W. Terry, *Kinetic ballooning mode turbulence in low-average-magnetic-shear equilibria*
6. 18<sup>th</sup> International Conference on Plasma-facing Materials and Components for Fusion Application (PFMC-18), 2021/05/17-2021/05/21, Jülich, Germany, P. Rindt, T.W. Morgan, J.L. van den Eijnden, S.Q. Korving, N.J. Lopes Cardozo, *Research and development of a liquid metal divertor for the EU-DEMO*, ID246
7. ITPA Realtime Specialists Working Group (RT-SWG), 2021/06/03, Online, France, M.R. de Baar, *Real-Time working group report 2021-1*
8. Sherwood Fusion Theory Conference 2021, 2021/08/16-2021/08/18, Online, USA, I.J. McKinney, M.J. Poeschel, C.C. Hegna, B.J. Faber, A. Ishizawa, P.W. Terry, *Kinetic ballooning mode turbulence in low-average-magnetic-shear equilibria*
9. International Conference on Diagnostics for Fusion reactors (ICFRD 2020), 2021/09/06-2021/09/10, Varenna, Italy, A.J.H. Donné, *European Fusion Roadmap*

10. International Conference on Diagnostics for Fusion reactors (ICFRD 2020), 2021/09/06-2021/09/10, Varenna, Italy, M.R. de Baar, *A systems and control perspective on fusion plasmas*
11. Work Package WPDC Review, 2021/09/15, Online, Germany, M.R. de Baar, *A systems engineering approach to Supervisory control for DEMO*, concept
12. Lorentz Center Workshop Magnetohydrodynamics: Classical physics for the 21st century, 2021/10/11-2021/10/15, Leiden, Netherlands, H. Goedbloed, *MHD waves in flowing media*, Opening lecture
13. 2021 Annual meeting of the Spanish Nuclear Society, 2021/10/06-2021/10/08, Granada, Spain, A.J.H. Donn , *The European fusion programme*
14. Fusenet Lecture, 2021/10/06, Online, M. van Berkel, R.J.R. van Kampen, J.T.W. Koenders, T.O.S.J. Bosman, *An introduction to control engineering with application to fusion: using multispectral imaging for feedback control of the detachment front*
15. 14<sup>th</sup> Carolus Magnus Summer School on Plasma Physics CMSS, 2021/09/20-2021/10/01, Online, Trilateral Euregio Cluster (TEC), M. van Berkel, R.J.R. van Kampen, J.T.W. Koenders, T.O.S.J. Bosman, *Data-driven analysis for control of fusion plasmas using perturbative experiments*
16. Introduction lecture on control for homologation for fusion (3MF513), 2021/09/10, Eindhoven, Netherlands, M. van Berkel, *Data-driven analysis for control of fusion plasmas using perturbative experiments*
17. 14<sup>th</sup> Carolus Magnus Summer School on Plasma Physics CMSS, 2021/09/20-2021/10/01, Online, Trilateral Euregio Cluster (TEC), M.R. de Baar, *A systems and control perspective on nuclear fusion*
18. 19<sup>th</sup> European Fusion Theory Conference 2021, 2021/10/11-2021/10/15, Online, Rome, Italy, I. Krebs, *Kinetic ballooning mode turbulence in low-average-magnetic-shear equilibria*
19. ITPA Realtime Specialists Working Group (RT-SWG), 2021/10/26, Online, France, M.R. de Baar, *Real-Time working group report 2021-2*
20. IAEA Technical Meeting (TM) on Artificial Intelligence for Nuclear Technology and Applications, 2021/10/25-2021/10/29, Online, Vienna, Austria, M.R. de Baar, *Roles the IAEA could play*, call 2021/10/26
21. Work Package WPDC Review, 2021/11/19, Online, Germany, M.R. de Baar, *A systems engineering approach to supervisory control for DEMO*, Status Report
22. Fusion Power Associates, 42<sup>nd</sup> Annual Meeting and Symposium: Pathways to Fusion Power 2021, 2021/12/15-2021/12/16, Washington, DC, USA, A.J.H. Donn , *Fusion research in Europe: Horizon EUROfusion ('21-'27)*

## 1.7 Invited seminars: 5

1. Indian Institute of Technology Hyderabad Physics Department Seminar 2021, 2021/04/01-2021/04/01, Telangana, India, M.J. Pueschel, *Turbulence in fusion plasmas - How damped waves regulate transport*
2. DTT Science Talk, ENEA (videoconference), 2021/03/10, Frascati, Italy, A.J.H. Donn , *Horizon EUROfusion*
3. Lunch talk Nikhef, 2021/05/04, Amsterdam, Netherlands, M.R. de Baar, *Roads to fusion. On the progress in fusion energy research, with a special focus on building ITER*
4. Seminar Comenius University, 2021/11/04, Bratislava, Slovakia, A.J.H. Donn , *Fusion research in Europe – Status and outlook*
5. BSBF webinar: A look into the future of Big Science infrastructures. Episode 2: Fusion: Strategies, roadmaps and development programmes, 2021/11/11, Online Big Science Business Forum, Spain, A.J.H. Donn , *European roadmap - DEMO development programme*

## 1.8 Oral and poster presentations at (international) conferences and meetings: 91

1. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, M. Hamed, J. Citrin, M.J. Pueschel, X. Garbet, M. Muraglia, Y. Camenen, *Efficient prediction of microtearing transport in high-performance plasmas*, Oral PW6B.3
2. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, K.L. van de Plassche, J. Citrin, C. Bourdelle, Y. Camenen, *Real-time first-principle based tokamak transport simulations using machine learning*, Oral PW6B.2
3. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, M. Marin, J. Citrin, L. Garzotti, M. Valovic, C. Bourdelle, Y. Camenen, F.J. Casson, A. Ho, S. Van Mulders, F. Koechl, *Multiple-isotope pellet cycles captured by turbulent transport modelling in the JET tokamak*, Oral PW6B.1
4. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, G. Akkermans, I. Classen, R. Perillo, H.J. van der Meiden, F. Federici, S. Brezinsek, *Detachment physics in the linear device Magnum-PSI - molecular and geometrical effects*, Oral PW6A.2
5. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, J. Koenders, M. van Berkel, *Towards model-based control of divertor detachment*, Oral PW6A.1
6. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, C. Onwudinanti, G. Brocks, J.M.V.A. Koelman, T.W. Morgan, S.X. Tao, *The influence of tin on blistering in EUV mirrors*, Oral PT2A.3
7. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, Y. Li, T.W. Morgan, *Three mechanisms of hydrogen-induced dislocation pinning in tungsten*, Oral PW6A.3
8. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, S.C. Wang, T.W. Morgan, *Plasma-induced deuterium retention in ru-capped materials*, Poster P08.003
9. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, F. Romano, T.W. Morgan, P. Rindt, J. Scholten, Y. Hayashi, *Effect of lithium vapour shielding on hydrogen plasma parameters*, Poster P08.006
10. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, A. Perek, B. Linehan, M. Wensing, K. Verhaegh, I.G.J. Classen, B.P. Duval, O. Fevrier, H. Reimerdes, C. Theiler, T. Wijkamp, et al., *Measurement of the 2D emission profiles of the bulk and impurity ions in the TCV divertor*, Poster P08.008
11. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, T. Wijkamp, A. Perek, J. Decker, B. Duval, M. Hoppe, G. Papp, U. Sheikh, I. Classen, R. Jaspers, *Reconstructing the runaway electron distribution in tokamaks using synchrotron radiation imaging*, Poster P08.016
12. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, R.J.R. van Kampen, A. Das, S. Weiland, M. van Berkel, *A closed-form solution to estimate space-dependent parameters in heat and mass transport*, Poster P08.007
13. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, J. Gonzalez, R. Chandra, E. Westerhof, *Precise numerical modeling of the plasma beam in MAGNUM-PSI*, Poster P08.011
14. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, I. Krebs, A. Burckhart, M. Hoelzl, A. Bock, S.C. Jardin, E. Westerhof, R. Fischer, S. Günter, K. Lackner, ASDEX Upgrade team, et al., *Magnetic flux pumping in the hybrid tokamak scenario: Comparing theory and experiment*, Poster P08.015
15. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, W. Ou, T.W. Morgan, *Deuterium retention and removal in liquid lithium determined by in-situ NRA in Magnum-PSI*, Poster P08.010
16. Ruhr University Bochum Digital Plasma Theory Day 2021, 2021/01/11-2021/01/12, Bochum, Germany, M.J. Pueschel, P.Y. Li, B. Tripathi, G.G. Whelan, K.D. Makwana, A.E. Fraser, D.R. Hatch, P.W. Terry, E.G. Zweibel, *Regulation of fusion and astrophysical turbulence by stable eigenmodes*, Oral
17. 2021 Max-Planck-Princeton Annual Meeting MPPC, 2021/01/19-2021/01/26, Online, Germany, M.J. Pueschel, R.D. Sydora, P.W. Terry, B. Tyburska-Pueschel, M. Francisquez, F. Jenko, B. Zhu, *Stability of magnetized pair plasmas in astrophysical and laboratory systems*, Oral

18. 2021 Max-Planck-Princeton Annual Meeting MPPC, 2021/01/19-2021/01/26, Online, Germany, M.J. Pueschel, S.W. Tsao, D. Told, P.W. Terry, F. Jenko, E.G. Zweibel, V. Zhdankin, H. Lesch, A. Tenerani, D.R. Hatch, *Gyrokinetic studies of turbulent magnetic reconnection in the solar corona*, Oral
19. 24<sup>th</sup> PSI Conference 2020, 2021/01/25-2021/01/29, Jeju, Korea, G.R.A. Akkermans, F. Federici, R. Perillo, I.G.J. Classen, M.R. de Baar, H.J. van der Meiden, MagnumPSI team, *Investigation the role of hydrogen molecular effects on detachment using Magnum-PSI*, Poster TP2-039(F)
20. 24<sup>th</sup> PSI Conference 2020, 2021/01/25-2021/01/29, Jeju, Korea, W. Ou, K. Li, P. Rindt, T.W. Morgan, *Deuterium retention in lithium-based 3D-printed tungsten targets exposed to fusion-relevant flux plasmas in Magnum-PSI*, Poster MP1-072(C)
21. 24<sup>th</sup> PSI Conference 2020, 2021/01/25-2021/01/29, Jeju, Korea, R. Chandra, H.J. de Blank, E. Westerhof, P. Diomede, *Quantitative analysis of collisional processes relevant for divertor detachment in Magnum-PSI*, Poster TP2-051(F)
22. 24<sup>th</sup> PSI Conference 2020, 2021/01/25-2021/01/29, Jeju, Korea, A. Perek, K.H.A. Verhaegh, B.H. Linehan, M. Wensing, M. van Berkel, I.G.J. Classen, B.P. Duval, O. Fevrier, T. Ravensbergen, M.R. de Baar, et al., *Inference of 2D maps of ionization and recombination with quantitative imaging in detached conditions of TCV divertor*, Poster TP3-018(F)
23. 24<sup>th</sup> PSI Conference 2020, 2021/01/25-2021/01/29, Jeju, Korea, T. Ravensbergen, M. van Berkel, A. Perek, C. Galperti, R.J.R. van Kampen, J.T. Lammers, K. Verhaegh, O. Fevrier, S. Henderson, M. Komm, et al., *Real-time feedback control of the impurity emission front in detached tokamak divertor plasmas*, Poster TP3-021(F)
24. 24<sup>th</sup> PSI Conference 2020, 2021/01/25-2021/01/29, Jeju, Korea, J. van den Berg, H.J. van der Meiden, J.W.M. Vernimmen, I.G.J. Classen, G.J. van Rooij, *Experimental determination of plasma parameters in the presheath region of the Magnum-PSI linear plasma generator*, Poster TP3-087(H)
25. 24<sup>th</sup> PSI Conference 2020, 2021/01/25-2021/01/29, Jeju, Korea, Y. Li, T.W. Morgan, J.A.W. van Dommelen, S. Antusch, M. Rieth, J.P. M. Hoefnagels, D. Terentyev, G. De Temmerman, M.G.D. Geers, *Fracture behavior of tungsten-based composites exposed to steady-state/transient hydrogen plasma*, Poster FP4-067(I)
26. 24<sup>th</sup> PSI Conference 2020, 2021/01/25-2021/01/29, Jeju, Korea, P. Rindt, S.Q. Korving, T.W. Morgan, N.J. Lopes Cardozo, *Performance of liquid-lithium-filled 3D-printed tungsten divertor targets under deuterium loading with ELM-like pulses in Magnum-PSI*, Poster FP4-077(I)
27. 22<sup>nd</sup> US Transport Task Force Workshop 2021, 2021/04/01-2021/04/01, Online, USA, M.J. Pueschel, *Modeling nonlinear mode interactions at turbulence regime boundaries*, Oral
28. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, H.J. van der Meiden, S. Almazov, J. Butikova, P. Gasior, A. Hakola, I. Jogi, G. Sergienko, P. Veis, S. Brezinsek, *LIBS for monitoring of tritium and impurities in the first wall of fusion devices*, Poster TECH/P8-17
29. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, J. Citrin, C. Bourdelle, Y. Camenen, F.J. Casson, X. Garbet, A. Ho, F. Jenko, F. Köchl, M. Marin, K.L. van de Plassche, et al., *Predict first: flux-driven multichannel integrated modelling over multiple confinement times with the gyrokinetic turbulent transport model QUALIKIZ*, Oral TH/5-2
30. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, M. Marin, J. Citrin, C. Bourdelle, Y. Camenen, A. Ho, F.J. Casson, L. Garzotti, F. Köchl, M. Maslov, M. Valovic, et al., *First-principle-based integrated modelling of multiple isotope pellet cycles at JET*, Poster TH/P2-23
31. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, A. Boboc, C. Giroud, C. Perez von Thun, E. Lerche, E. de la Luna, E. Delabie, F. Köchl, G. Tvalashvili, J. Citrin, M. Marin, et al., *Control of h/d isotope mix by peripheral pellets in h-mode plasma in JET*, Poster EX/P3-4
32. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, Y.S. Na, Y.H. Lee, C.S. Byun, S.K. Kim, C.Y. Lee, M.S. Park, S.M. Yang, B. Kim, Y.M. Jeon, J. Citrin, et al., *Hybrid Scenarios in KSTAR: Experimental approach and physics understanding*, Poster EX/P2-30

33. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, T. Tala, A. Salmi, J. Citrin, E.R. Solano, R.B. Morales, I. Carvalho, A. Czarnecka, E. Delabie, F. Eriksson, M. Marin, et al., *Comparison of particle transport and confinement properties between the ICRH and NBI heated dimensionless identity plasmas on JET*, Poster EX/P3-2
34. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, A. Mariani, N. Bonanomi, P. Mantica, C. Angioni, F.J. Casson, J. Citrin, T. Görler, D. Keeling, E. Lerche, O. Sauter, et al., *Experimental investigation and gyrokinetic simulations of multiscale electron heat transport in JET, AUG and TCV*, Oral TH/5-EX/3-1
35. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, F. Felici, T.C. Blanken, T.O.S.J. Bosman, F. Carpanese, C. Galperti, M. Kong, A. Merle, J. Moret, S. Van Mulder, A. Pau, et al., *Integrated plasma state reconstruction, off-normal event handling and control, with application to TCV and ASDEX upgrade*, Poster EX/P4-04
36. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, P. Manas, C. Angioni, J.F. Artaud, C. Bourdelle, J. Citrin, E. Fable, F. Felici, F. Jenko, P. Maget, C. Stephens, et al., *Tungsten transport in tokamaks: towards real-time kinetic-theory-based plasma performance optimization*, Poster TH/P2-21
37. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, I. Casiraghi, P. Mantica, F. Köchl, R. Ambrosino, J. Citrin, L. Frassinetti, A. Mariani, P. Vincenzi, P. Agostinetti, B. Baiocchi, et al., *First-principle based multichannel integrated modelling in support to the design of the divertor tokamak test facility*, Poster TH/P2-26
38. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, M. Reinhart, S. Brezinsek, J. W. Coenen, T. Schwartz-Selinger, K. Schmid, A. Kirschner, A. Hakola, H.J. van der Meiden, R. Dejarnac, E. Tsitroni, et al., *Latest results of EUROfusion plasma-facing components research in the areas of power loading, material erosion and fuel retention*, Poster OV/P-8
39. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, M. Yoshikawa, J. Kohagura, N. Ezumi, T. Iijima, K. Nojiri, A. Terakado, Y. Nakashima, T. Kariya, T. Numakura, H.J. van der Meiden, et al., *Study of detached plasma profile in the divertor simulation experimental module of gamma 10/PDX*, Poster EX/P8-1
40. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, K. Verhaegh, B. Lipschultz, J. Harrison, B. Duval, A. Fil, D.S. Gahle, D. Moulton, A. Perek, S. Henderson, C. Theiler, et al., *Investigating the role of plasma-atom/molecule interactions on power, particle and momentum balance during detachment*, Poster EX/P4-19
41. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, S. Brezinsek, G. De Temmerman, N. Rodriguez, M. Balden, T. Schwartz-Selinger, T. Loewenhoff, T.W. Morgan, Y. Li, M. Wirtz, *High fluence steady-state and high cycle number ELM-like loading of ITER-like monoblocks in Magnum-PSI*, Oral
42. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, C. Theiler, H. de Oliveira, B. Duval, O. Fevrier, A. Fil, H. Reimerdes, A. Thornton, M. Wensing, M. Baquero-Ruiz, A. Perek, et al., *Advances in understanding power exhaust physics with the new, Baffled TCV Divertor*, Oral EX/7-5
43. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, D. Borodin, F. Schluck, S. Wiesen, D. Harting, P. Boerner, S. Brezinsek, W. Dekeyser, S. Carli, M. Blommaert, E. Westerhof, et al., *Fluid, kinetic and hybrid approaches for edge transport modelling in fusion devices*, Poster TH/P2-1
44. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, K.L. van de Plassche, J. Citrin, C. Bourdelle, Y. Camenen, F.J. Casson, V. Dagnelie, F. Felici, A. Ho, S. Van Mulders, JET Contributors, *Fast modelling of turbulent transport in fusion plasmas using neural networks*, Poster TH/P7-20
45. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, T.W. Morgan, M. Balden, T. Schwartz-Selinger, Y. Li, T. Loewenhoff, M. Wirtz, S. Brezinsek, G. De Temmerman, D. Nishijima, *Accelerated lifetime tests of ITER-Like tungsten monoblocks in Magnum-PSI*, Oral TECH/3-1
46. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, A. Burckhart, A. Bock, R. Fischer, I. Krebs, A. Gude, M. Hölzl, V. Igochine, T. Pütterich, J. Stober, ASDEX Upgrade team, *Experimental evidence of magnetic flux pumping at ASDEX upgrade*, Oral EX/4-1

47. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, A. Dinklage, G. Fuchert, R.C. Wolf, A. Alonso, T. Andreeva, C. Beidler, M.R. de Baar, Y. Gao, B. Geiger, M. Jakubowski, et al., *Theory-based models for the control of W7-X divertor plasmas*, Poster EX/P6-3
48. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, C. Giroud, S. Brezinsek, R.A. Pitts, A. Huber, J. Mailloux, A. Chankin, E. Kaveeva, S. Henderson, J. Hillesheim, M. Marin, et al., *High performance ITER-baseline discharges in deuterium with nitrogen and neon-seeding in the JET-ILW*, Poster EX/P3-9
49. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, S.C. Jardin, C. Clauser, N. Ferraro, I. Krebs, F.J. Artola, K.J. Bunkers, C.R. Sovinec, M. Hölzl, F. Villone, G. Rubinacci, et al., *Vessel forces from a vertical displacement event in ITER*, Poster TH/P3-14
50. 18<sup>th</sup> International Conference on Plasma-facing Materials and Components for Fusion Application (PFMC-18), 2021/05/17-2021/05/21, Jülich, Germany, J. van den Berg, H.J. van der Meiden, I. Classen, G.J. van Rooij, *Effects of strong thermionic emission on plasma-surface interaction studied in Magnum-PSI*, Poster ID207
51. 18<sup>th</sup> International Conference on Plasma-facing Materials and Components for Fusion Application (PFMC-18), 2021/05/17-2021/05/21, Jülich, Germany, F. Romano, T.W. Morgan, P. Rindt, J. Scholten, Y. Hayashi, *Effect of lithium vapour shielding on hydrogen plasma parameters*, Oral (short) ID246
52. 18<sup>th</sup> International Conference on Plasma-facing Materials and Components for Fusion Application (PFMC-18), 2021/05/17-2021/05/21, Jülich, Germany, V. Shah, Y. Li, J.T. S. Beune, T.W. Morgan, J.A.W. van Dommelen, *Recrystallization behaviour of high-flux hydrogen plasma exposed tungsten*, Poster ID261
53. 18<sup>th</sup> International Conference on Plasma-facing Materials and Components for Fusion Application (PFMC-18), 2021/05/17-2021/05/21, Jülich, Germany, A. Marín-Roldan, V. Dwivedi, M. Veis, H. van der Meiden, M. Drzik, P. Veis, *Comparison of ns/ps CF-LIBS. Analysis of WZr for future fusion applications*, Poster ID340
54. 18<sup>th</sup> International Conference on Plasma-facing Materials and Components for Fusion Application (PFMC-18), 2021/05/17-2021/05/21, Jülich, Germany, I. Jogi, P. Paris, K. Piip, J. Ristkok, H.M. Piirsoo, A. Tamm, E. Grigore, A. Hakola, B. Tyburska-Pueschel, H.J. van der Meiden, *LIBS applicability for investigation of re-deposition and fuel retention in tungsten coatings exposed to pure and nitrogen-mixed deuterium plasmas of Magnum-PSI*, Oral (short) ID264
55. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, J.T.W. Koenders, A. Perek, O. Fevrier, C. Galperti, B. Kool, M. van Berkel, T. Ravensbergen, C. Theiler, B.P. Duval, M.R. de Baar, et al., *Real-time control of impurity emission fronts by nitrogen seeding in TCV*, Poster P1.1058
56. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, S. Van Mulders, F. Felici, O. Sauter, J. Citrin, A. Ho, M. Marin, K.L. van de Plassche, *A novel tool for rapid optimization of stationary tokamak plasmas using RAPTOR-QLKNN applied to the ITER hybrid scenario*, Poster P5.1053
57. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, I. Krebs, S.C. Jardin, M. Hoelzl, A. Burckhart, A. Bock, R. Fischer, E. Westerhof, S. Günter, K. Lackner, J. Citrin, et al., *Theoretical model for magnetic flux pumping in hybrid tokamak discharges based on 3D nonlinear magneto-hydrodynamic simulations*, Poster P2.1034
58. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, T. Tala, A. Salmi, E.R. Solano, R.B. Morales, I.S. Carvalho, J. Citrin, A. Chomiczewska, E. Delabie, F. Eriksson, M. Marin, et al., *ICRH and NBI heated dimensionless identity plasmas on JET*, Poster P1.1077
59. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, I. Casiraghi, P. Mantica, F. Koechl, R. Ambrosino, L. Aucone, B. Baiocchi, C. Castaldo, M. Dicorato, L. Frassinetti, J. Citrin, et al., *Integrated modelling of the main divertor tokamak test facility scenarios*, Poster P2.1078
60. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, G. Snoep, J. Citrin, C. Bourdelle, F. Jenko, A. Ho, M. Marin, E. Delabie, M.J. Pueschel, E.R. Solano, C.D. Stephens, et al., *Validation of reduced-order turbulence modelling in L-mode near-edge*, Poster P5.1069

61. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, T.A. Wijkamp, A. Perek, J. Decker, B.P. Duval, M. Hoppe, G. Papp, U. Sheikh, I.G.J. Classen, R.J.E. Jaspers, TCV team, et al., *Runaway electron distribution reconstruction using multispectral synchrotron imaging at TCV*, Poster P5.1005
62. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, E. Westerhof, H.J. de Blank, R. Chandra, J. Frankemölle, *A 1D code for studies of divertor detachment dynamics*, Poster P5.1015
63. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, F. Federici, G.R.A. Akkermans, I.G.J. Classen, MagnumPSI team, *Effect of detachment on Magnum-PSI ELM-like pulses*, Poster P1.1024
64. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, J. Citrin, C. Angioni, N. Bonanomi, F.J. Casson, T. Görler, S. Maeyama, P. Mantica, A. Mariani, G.M. Staebler, T. Watanabe, et al., *Validating reduced turbulence model predictions of electron temperature gradient transport on a JET improved-confinement scenario*, Poster P4.1075
65. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, C.D. Stephens, J. Citrin, C. Bourdelle, F. Jenko, *Effective trapped fraction: A reduced collisional model for trapped electron modes*, Poster P4.1074
66. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, G.M. Staebler, J. Candy, E. Belli, J.E. Kinsey, N. Bonanomi, J. Citrin, P. Mantica, R.E. Waltz, JET Contributors, *The local magnetic field scaling of gyrokinetic turbulence and its impact on tokamak transport*, Poster P3.1069
67. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, H. de Oliveira, B.P. Duval, O. Fevrier, H. Reimerdes, C. Theiler, M. Wensing, C. Colandrea, D. Brida, S. Gorno, A. Perek, et al., *Heat exhaust capabilities of the recently upgraded TCV divertor*, Oral O2.106
68. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, C. Colandrea, H. de Oliveira, M. Wensing, B.P. Duval, O. Fevrier, S. Gorno, B.H. Linehan, L. Martinelli, A. Perek, H. Reimerdes, et al., *Testing the SOLPS-ITER drift model in Ohmic TCV discharges*, Poster P5.1025
69. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, H. Raj, C. Theiler, A. Thornton, F. Bagnato, P. Blanchard, C. Colandrea, B.P. Duval, O. Fevrier, S. Gorno, A. Perek, et al., *Influence of divertor geometry and baffles on nitrogen seeded h-mode discharges in TCV*, Poster P4.1024
70. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, L. Martinelli, B.P. Duval, D. Mykytchuk, A. Perek, B. Vincent, C. Colandrea, O. Fevrier, S. Gorno, B. Linehan, H. de Oliveira, et al., *Spectroscopic studies of TCV divertor plasma with the DSS upgrade*, Oral O5.J502
71. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, M. Hamed, M. Muraglia, X. Garbet, Y. Camenen, J. Citrin, M.J. Pueschel, *A reduced model for microtearing instability and transport*, Oral O4.106
72. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, A. Ho, J. Citrin, C. Bourdelle, Y. Camenen, F.J. Casson, K.L. van de Plassche, H. Weisen, JET Contributors, *A fast neural network surrogate of the QuaLiKiz turbulent transport model for JET discharge modelling*, Poster P4.1072
73. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, M.J. Pueschel, P.Y. Li, P.W. Terry, G.G. Whelan, *Fast prediction of transport near the critical gradient*, Poster P5.1077
74. 30<sup>th</sup> meeting of ITPA Topical Group SOL and Divertor Physics (DivSOL), 2021/07/05-2021/07/16, Online, France, J.T.W. Koenders, M. van Berkel, A. Perek, C. Galperti, B.P. Duval, O. Fevrier, B. Kool, T. Ravensbergen, C. Theiler, M.R. de Baar, et al., *Detachment control in TCV and AUG*, Oral
75. 13<sup>th</sup> IAEA Technical Meeting on Plasma Control Systems, Data Management and Remote Experiments in Fusion Research 2021, 2021/07/05-2021/07/08, Online, Culham, UK, C. Galperti, F. Felici, T. Vu, O. Sauter, F. Carpanese, M. Kong, J.T.W. Koenders, B. Kool, A. Perek, T. Ravensbergen, et al., *Overview of the TCV digital real time plasma control system and its applications*, Oral
76. International Conference on Diagnostics for Fusion reactors (ICFRD 2020), 2021/09/06-2021/09/10, Varenna, Italy, J.T.W. Koenders, A. Perek, M. van Berkel, C. Galperti, B.P. Duval, O. Fevrier, B. Kool, T. Ravensbergen, C. Theiler, M.R. de Baar, *Feedback control using divertor multi-spectral imaging diagnostics*, Oral Oral\_21



77. 25<sup>th</sup> Joint EU-US Transport Task Force Meeting (TTF 2021), 2021/09/06-2021/09/10, York, UK, A. Ho, C.D. Challis, J. Citrin, K.L. van de Plassche, JET Contributors, *JET hybrid ramp-up integrated modelling accelerated by QuaLiKiz neural network and predictive analysis for JET tritium discharges*, Poster
78. 25<sup>th</sup> Joint EU-US Transport Task Force Meeting (TTF 2021), 2021/09/06-2021/09/10, York, UK, G. Snoep, J. Citrin, C. Bourdelle, F. Jenko, A. Ho, M. Marin, E. Delabie, M.J. Pueschel, E.R. Solano, C.D. Stephens, et al., *Validation of reduced-order turbulence modelling in the tokamak L-mode near-edge*, Oral
79. 25<sup>th</sup> Joint EU-US Transport Task Force Meeting (TTF 2021), 2021/09/06-2021/09/10, York, UK, Y. Camenen, K.L. van de Plassche, C. Bourdelle, J. Citrin, T. Görler, F. Imbeaux, *Update on the gyro-kinetic database project*, Poster
80. 25<sup>th</sup> Joint EU-US Transport Task Force Meeting (TTF 2021), 2021/09/06-2021/09/10, York, UK, K. Tanaka, S. Coda, P. Blanchard, A. Karpushov, B. Labit, F. Bagnato, L. Martinelli, D. Mykytchuk, A. Perek, H. Weisen, et al., *Isotope effects on particle transport in TCV ohmic discharge*, Poster
81. 25<sup>th</sup> Joint EU-US Transport Task Force Meeting (TTF 2021), 2021/09/06-2021/09/10, York, UK, I. Casiraghi, P. Mantica, F. Köchl, R. Ambrosino, L. Aucone, B. Baiocchi, A. Castaldo, J. Citrin, M. Dicorato, L. Frassinetti, et al., *Overview on the first-principle integrated modelling of the main scenarios of the new divertor tokamak test facility*, Oral
82. 25<sup>th</sup> Joint EU-US Transport Task Force Meeting (TTF 2021), 2021/09/06-2021/09/10, York, UK, C. Bourdelle, C. Angioni, J.F. Artaud, Y. Camenen, F.J. Casson, J. Citrin, E. Fable, F. Felici, A. Ho, K.L. van de Plassche, et al., *Physics model development and extensive validation of predictive integrated modelling within the new EU framework programme 2021-2027* (TSWV11 activity), Poster
83. 25<sup>th</sup> Joint EU-US Transport Task Force Meeting (TTF 2021), 2021/09/06-2021/09/10, York, UK, A. Iantchenko, M.J. Pueschel, S. Brunner, S. Coda, *Gyrokinetic simulations of turbulence in JT-60SA with the GENE code*, Poster
84. 25<sup>th</sup> Joint EU-US Transport Task Force Meeting (TTF 2021), 2021/09/06-2021/09/10, York, UK, C. Gillot, G. Dif-Pradalier, Y. Sarazin, C. Bourdelle, Y. Camenen, J. Citrin, P. Ghendrih, X. Garbet, V. Grandgirard, P. Manas, et al., *Fidelity of model reduction: implications of near marginality*, Poster
85. Plasma Edge Theory Workshop 2021, 2021/09/13-2021/09/15, Online, Switzerland, M.J. Pueschel, *How RMPs Affect l- and h-mode edge turbulence via zonal-flow regulation*, Oral
86. 2<sup>nd</sup> European Fusion Teacher Day 2021, Domestic session Netherlands, 2021/10/01, Eindhoven, Netherlands, T.W. Morgan, *Divertor fusion*, Oral
87. 2<sup>nd</sup> European Fusion Teacher Day 2021, Domestic session Netherlands, 2021/10/01, Eindhoven, Netherlands, J. Citrin, *Artificial intelligence (AI) in fusion*, Oral
88. ITPA Transport and Confinement Topical Group Fall Meeting 2021, 2021/10/01, Online, France, M.J. Pueschel, *RMP impact on turbulence via zonal-flow regulation*, Oral
89. AGU Fall Meeting 2021, 2021/12/13-2021/12/17, Hybrid, New Orleans, LA, USA, A. Bertagnoli, R.J.R. van Kampen, U. Schneidewind, G. Vandersteen, C.H. Luce, S. Krause, M. van Berkel, A. Tranmer, D. Tonina, *iFlow: a new graphical user interface to quantify thermal properties and advection from temperature time-series analysis*, Oral H350-1212
90. AGU Fall Meeting 2021, 2021/12/13-2021/12/17, Hybrid, New Orleans, LA, USA, R.J.R. van Kampen, U. Schneidewind, C. Anibas, A. Bertagnoli, D. Tonina, G. Vandersteen, C.H. Luce, S. Krause, M. van Berkel, *On the Validity of flux estimates using semi-infinite domains. Comparing flux estimates from semi-infinite and bounded domains using the LPMLen - a multi frequency, multi sensor method to estimate vertical streambed fluxes and sediment thermal properties*, Oral H33E-07
91. AGU Fall Meeting 2021, 2021/12/13-2021/12/17, Hybrid, New Orleans, LA, USA, C.H. Luce, M. van Berkel, R.J.R. van Kampen, U. Schneidewind, D. Tonina, A. Bertagnoli, S. Krause, *A framework for improving methods for inverse modeling of streambed fluxes and thermal diffusivity using temperature time series*, Oral H33E-06

### 1.9 Positions, including editorships: 25

1. M.R. de Baar, Member of the Fusion for Energy (F4E) Governing Board (since 2019)
2. M.R. de Baar, Chair Realtime Specialists Working Group (RT-SWG) of ITPA framework for ITER (2018-2021)
3. M.R. de Baar, Member executive board ITER-NL consortium (since 2014) and program leader for the MHD stabilization work package
4. M.R. de Baar, Panel Member at ICFRD 2020/21 Panel Discussion: "Diagnostic needs for fusion demo and power plants", Varenna, Italy
5. M.R. de Baar, Professor at Eindhoven University of Technology (since 2012)
6. M.R. de Baar, Lecturer Course series at Eindhoven University of Technology (since 2015)
7. M.R. de Baar, Member of the Advisory Board FONTYS Applied Natural Sciences (since 2018)
8. A.J.H. Donné, Member International Scientific Committee AAPPS-DPP Conference (Association of Asia Pacific Physical Societies) (since 2017)
9. A.J.H. Donné, Member EIROforum Council (member since 2014, chair 2018-2019)
10. A.J.H. Donné, Member of the International Scientific Advisory Board (Fachbeirat) of the Max-Planck-Institut for Plasma Physics (since 2014)
11. A.J.H. Donné, Member Coordinating Committee ITER IO-Broader Approach agreement (since 2020)
12. A.J.H. Donné, Member of the International Advisory Committee of EAST (Hefei, China) (since 2015)
13. A.J.H. Donné, Member IFMIF-DONES Prep Council (Int. Fusion Materials Irradiation Facility/DEMO Oriented NEutron Source) (since 2020)
14. A.J.H. Donné, Chair of Coordinating Committee of the International Tokamak Physics Activity (ITPA-CC) (since 2014)
15. H. Goedbloed, Member Program Organizers Hybrid Workshop Magnetohydrodynamics: Physics for the 21st Century, 11-15 Oct 2021
16. H.J. de Blank, Lecturer Course series at Eindhoven University of Technology (since 2015)
17. H.J. de Blank, Member of the Organizing Committee of the Carolus Magnus Summer School on Plasma Physics (since 2014)
18. J. Citrin, Member Scientific Program Committee of the 25th Joint US-EU Transport Task Force Meeting (TTF 2021)
19. J. Citrin, Associate Professor Eindhoven University of Technology (since 2019)
20. J. Citrin, Member Scientific Committee of the 25th Joint EU-US Transport Task Force Meeting 2021
21. M.J. Pueschel, Member U.S. National Stellarator Coordinating Committee
22. M.J. Pueschel, Member NWO advisory committee Physics of Fluids and Soft Matter (since 2021)
23. M.J. Pueschel, Lecturer at Eindhoven University of Technology (since 2021)
24. M.J. Pueschel, Member Theory Project Board, EUROfusion Fusion Science Department
25. T.W. Morgan, Member Program Committee International Conference on Plasma-Facing Materials and Components for Fusion Applications PFMC (since 2019)

### 1.10 Publications aimed at the general public: 1

1. J.P. Keulen, *De Fusiedroom. Feiten en fabels over een veelbelovende energiebron*, New Scientist books / Veen Media BV., 2021/04/20, ISBN: 9789085717287

### 1.11 Book (chapters): 2

1. A.J.H. Donné, G. Federici, A. Ibarra, J. Menard, F. Warmer, *Magnetic Confinement Fusion - Development Facilities*, In: Encyclopedia on Nuclear Energy, 2021, Elsevier Inc., p.635-654, ISBN: 9780128197257

2. A.J.H. Donn , *Plasma Diagnostics*, In: Fundamentals of Magnetic Fusion Technology, Ch.3, 2021, IAEA, p. 57-95

### 1.12 Public events and Industry contacts: 9

1. M.R. de Baar, Valorisatie bij DIFFER, 2021/01/25, Dutch Ministry EZK, Innovation and knowledge, Netherlands
2. M.R. de Baar, De weg naar kernfusie, Koninklijk Genootschap Physica, 2021/02/01, Alkmaar, Netherlands
3. M.R. de Baar, Reality check Kernfusie, SmartPort Sessie Energy Mix voor Samenwerkingsverband Gridmaster, 2021/02/02, Rotterdam, Netherlands
4. M.R. de Baar, De weg naar kernfusie, Sterrenkundeclub Radboud, 2021/02/06, Nijmegen, Netherlands
5. M.R. de Baar, How to confuse physicists? Or how to identify the independent body of engineering knowledge, Symposium 'Fusion Research' Fusion Technology Through the Eyes of Social Scientists and Humanities Scholars, 2021/06/18, Online, Netherlands
6. M.R. de Baar, Reality check Kernfusie, JBR Energieavond, 2021/06/10, Zeist, Netherlands
7. M.R. de Baar, Expert comment on 2017 movie 'Let There Be Light' on ITER and Fusion research, Science Filmclub InScience en NEMO Kennislink, 2021/12/01, Amsterdam, Netherlands
8. A. Vrouwe, Sharing memories: Glimpse into daily life at FOM Institute for Plasma Physics, Symposium 'Fusion Research' Fusion Technology Through the Eyes of Social Scientists and Humanities Scholars, 2021/06/18, Online, Netherlands
9. M. van Berkel, Control of thermal systems in nuclear fusion and industry: data-driven and model-based approaches, ILO-net Symposium Challenges in design, modelling and control of thermal systems, 2021/10/07, Online, Netherlands

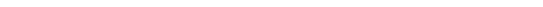
### 1.13 Awards: 2

1. T. Beernaert, P. Etman, M. De Bock, I. Classen, M.R. de Baar, 2021 ICED Conference Design Science Best Paper award, 2021/08/19
2. J.T.W. Koenders, 2021 ICFRD Conference Best Young Speaker (born in 1988 or later) award, 2021/09/10

### 1.14 Media appearances: 24

1. *Bouw van Nederlandse kerncentrales op korte termijn onrealistisch*, BNR, 2021/12/31, Interview with M. de Baar
2. *Te land, ter zee en in de lucht: gaan deze drie technologie n ons energieprobleem oplossen?*, De Volkskrant, 2021/02/12, Interview with T. Donn , A. Goede, M. Tsampas
3. *When fusion electricity will come to the grid?*, Swiss Public Radio on possible commercial use of fusion energy, 2021/10/18, Interview with A.J.H. Donn 
4. *Kernenergie binnen tien jaar?*, BNR, 2021/09/02, Interview with M. de Baar
5. *Peter Rindt over kernfusie bij Jinek*, RTL4, 2021/09/02, Interview with P. Rindt
6. *Thoriumcentrale als oplossing voor het klimaatprobleem?*, Tubantia, 2021/08/16, General coverage
7. Podcast Sound of Science: Ralf Mackenbach (TU/e) over fusie, TU/e, 2021/07/22, General coverage
8. *Krijgt ITER een wand van vloeibaar metaal?*, C2W, 2021/06/28, Interview with T. Morgan
9. *Vloeibaar metalen reactorwand*, Technisch Weekblad (TW), 2021/06/04, General coverage
10. *Een hiteschild van vloeibaar metaal*, BNR, 2021/05/27, Interview with T. Morgan

11. *NWO kent 2,5 miljoen toe aan DIFFER en TU/e voor bouw nieuw fusielab*, Cursor, 2021/05/26, Interview with T. Morgan, P. Rindt
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13. *ED: Vloeibare muur als hitteschild fusiereactor*, ED, 2021/05/25, Interview with T. Morgan
14. *2,5 miljoen euro voor TU/e voor onderzoek naar hittebestendige reactorwanden*, Studio040, 2021/05/25, Interview with T. Morgan, P. Rindt
15. *Bijzondere vondst in Eindhoven: door middel van een vloeibare muur kan een fusiereactor extreme hitte doorstaan*, BN De Stem, 2021/05/25, Interview with T. Morgan
16. *20 miljoen euro voor wetenschappelijke infrastructuur*, Infraside.nl, 2021/05/21, General coverage
17. *NWO investeert in technologisch onderzoek*, De Ingenieur, 2021/05/21, Interview with T. Morgan
18. *Fusieonderzoeker TU/e genomineerd voor wetenschapstalent 2021*, Cursor, 2021/05/01, Interview with P. Rindt
19. *Doe maar Duurzaam - Fusie op DIFFER*, RTLZ – Advertorial, 2021/04/17, General coverage
20. *Heat loss control method in fusion reactors*, EPFL News, 2021/02/19, Interview with T. Ravensbergen, M. van Berkel
21. *De hitte van een fusiereactor beheersen*, Ingenieur, de, 2021/02/17, Interview with T. Ravensbergen, M. van Berkel
22. *Fusion electricity and the CO<sub>2</sub> transition*, Radiogiornale, RSI Radiotelevisione svizzera, 2021/01/21, Interview with A.J.H. Donné
23. *Smashing atoms for Science and Energy*, Space Rocks, livestream on internet, 2021/01/21, Interview with A.J.H. Donné
24. *Kernfusie is geen eeuwige belofte, maar duurt wel lang*, Energieia, 2021/01/06, Interview with M. van Berkel



## 2. Output Solar Fuels

### 2.1 MSc theses, BSc theses and Master internship reports: 5

1. C. Cerrada Solé, *CO<sub>2</sub> neutral fuels by electrochemical means*, Master thesis Eindhoven University of Technology, 2021/06/30, Mentor: M. Tsampas
2. S. Ceulemans, *Investigation of a He/O<sub>2</sub> plasma in a bari brushed electrode (BABE) reactor for combined plasma conversion and solid oxide electrolysis using models and experiments*, 2021/06/30, Master thesis University of Antwerp, Mentor: F.J.J. Peeters, M.C.M. van de Sanden
3. E.R. Mercer, *Effect of quenching and preheating on CO<sub>2</sub> microwave plasmas: improving industrial applicability*, 2021/06/30, Master thesis University of Antwerp, Mentor: M.C.M. van de Sanden, F.J.J. Peeters, W.A. Bongers, F. Smits
4. R. van Limpt, *Investigation of solution processed BiFeO<sub>3</sub> for photoelectrochemical water splitting*, Master internship report Groningen University, 2021/07/31, Mentor: A. Bieberle-Hütter
5. S. Schneider, *Synthesis and photoelectrochemical performance of BiMn<sub>2</sub>O<sub>5</sub> thin films*, 2021/09/30, Master internship report Eindhoven University of Technology, Mentor: A. Bieberle-Hütter

### 2.2 PhD theses: 4

1. Q. Liang, *First-principles study of electrode materials for oxygen evolution*, PhD thesis at the Eindhoven University of Technology, 2021/12/01, Promotor: G. Brocks; Co-promotor: A. Bieberle-Hütter
2. L. Vialto, *Modelling of plasma for CO<sub>2</sub> conversion: electron kinetics, chemistry and transport*, PhD thesis at the Eindhoven University of Technology, 2021/11/25, Promotor: J. van Dijk, M.C.M. van de Sanden; Co-promotor: P. Diomedea
3. Q. Zhang, *A computational approach for high-throughput virtual screening of organic electroactive compounds for aqueous redox flow batteries*, PhD thesis at the Eindhoven University of Technology, 2021/11/01, Promotor: R.A.J. Janssen; Co-promotor: S. Er
4. N.J.J. van Hoof, *Mapping Ultrafast Electric Fields using Terahertz Microscopy*, PhD thesis at the Eindhoven University of Technology, 2021/06/03, Promotor: J. Gomez Rivas, I. Tafur Monroy

### 2.3 Publications in peer-reviewed scientific journals: 54

1. S. Abbasi, A. Forner-Cuenca, W. Kout, K. Nijmeijer, Z. Borneman, *Low-cost wire-electrospun sulfonated poly(ether ether ketone)/poly(vinylidene fluoride) blend membranes for hydrogen-bromine flow batteries*, *J. Membr. Sci.* 628 (2021) 119258
2. O. Almora, D. Baran, G.C. Bazan, C. Berger, C.I. Cabrera, K.R. Catchpole, S. Erten-Ela, F. Guo, J. Hauch, A. W. Y. Ho-Baillie, R.A.J. Janssen, T. Kirchartz, N. Kopidakis, Y.F. Li, M.A. Loi, R.R. Lunt, X. Mathew, M.D. McGehee, J. Min, D.B. Mitzi, M.K. Nazeeruddin, J. Nelson, A.F. Nogueira, U.W. Paetzold, N.G. Park, B.P. Rand, U. Rau, H.J. Snaith, E. Unger, L. Vaillant-Roca, H.L. Yip, C.J. Brabec, *Device performance of emerging photovoltaic materials (Version 1)*, *Adv. Energy Mater.* 11 (2021) 2002774
3. C.W. Anderson, R. Armiento, E. Blokhin, G.J. Conduit, S. Dwaraknath, M.L. Evans, A. Fekete, A. Gopakumar, S. Grazulis, S. Er, A. Merkys, F. Mohamed, C. Oses, G. Pizzi, G. Rignanese, M. Scheidgen, L. Talirz, C. Toher,

- D. Winston, R. Aversa, K. Choudhary, P. Colinet, S. Curtarolo, D. Di Stefano, C. Draxl, M. Esters, M. Fornari, M. Giantomassi, M. Govoni, G. Hautier, V. Hegde, M.K. Horton, P. Huck, G. Huhs, J. Hummelshoj, A. Kariryaa, B. Kozinsky, S. Kumbhar, M. Liu, N. Marzari, A.J. Morris, A.A. Mostofi, K.A. Persson, G. Petretto, T. Purcell, F. Ricci, F. Rose, M. Scheffler, D. Speckhard, M. Uhrin, A. Vaitkus, P. Villars, D. Waroquiers, C. Wolverton, M. Wu, X.Y. Yang, *OPTIMADE, an API for exchanging materials data*, Nat. Sci. Data 8 (2021) 217
4. A.Bieberle-Hütter, A.C. Bronneberg, K. George, M.C.M. van de Sanden, *Operando attenuated total reflection Fourier-transform infrared (ATR-FTIR) spectroscopy for water splitting*, J. Phys. D: Appl. Phys. 54 (2021) 133001
  5. H.J. Bin, M.M. Wienk, R.A.J. Janssen, *Efficient solar cells based on a polymer donor with  $\beta$ -branching in trialkylsilyl side chains*, Org. Mater. 3 (2021) 134-140
  6. H.J. Bin, J.K. Wang, J.Y. Li, M.M. Wienk, R.A.J. Janssen, *Efficient electron transport layer free small-molecule organic solar cells with superior device stability*, Adv. Mater. 33 (2021) 2008429
  7. A. Caiazza, K. Datta, J.K. Jiang, M.C. Gelvez-Rueda, J.Y. Li, R. Olletero, J.M. Vicent-Luna, S.X. Tao, M.M. Wienk, F.C. Grozema, R.A.J. Janssen, *Effect of co-solvents on the crystallization and phase distribution of mixed-dimensional perovskites*, Adv. Energy Mater. 11 (2021) 2102144
  8. K. Datta, B.T. van Gorkom, Z. Chen, M.J. Dyson, T.P.A. van der Pol, S.C.J. Meskers, S.X. Tao, P.A. Bobbert, M.M. Wienk, R.A.J. Janssen, *Effect of light-induced halide segregation on the performance of mixed-halide perovskite solar cells*, ACS Appl. Energy Mater. 4 (2021) 6650-6658
  9. N. Daub, R.A.J. Janssen, K.H. Hendriks, *Imide-based multielectron anolytes as high-performance materials in nonaqueous redox flow batteries*, ACS Appl. Energy Mater. 4 (2021) 9248-9257
  10. E.J. Devid, M. Ronda-Lloret, D. Zhang, E. Schuler, D. Wang, C.H. Liang, Q. Huang, G. Rothenberg, N.R. Shiju, A.W. Kleyn, *Enhancing CO<sub>2</sub> plasma conversion using metal grid catalysts*, J. Appl. Phys. 129 (2021) 053306
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  12. J.A. Fernandez, S. Carretero-Palacios, L. Sanchez-Garzia, J. Bravo-Abad, P. Molina, N. van Hoof, M.O. Ramirez, J. Gomez Rivas, L.E. Bauza, *Spatial coherence from Nd<sup>3+</sup> quantum emitters mediated by a plasmonic chain*, Opt. Express 29 (2021) 26244-26254
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  17. Y.A. Hugo, W. Kout, A. Forner-Cuenca, Z. Borneman, K. Nijmeijer, *Wire based electrospun composite short side chain perfluorosulfonic acid/polyvinylidene fluoride membranes for hydrogen-bromine flow batteries*, J. Power Sources 497 (2021) 229812
  18. S. Kandhasamy, G. Nikiforidis, G.J. Jongerden, E.F. Jongerden, M.C.M. van de Sanden, M.N. Tsampas, *Operational strategies to improve the performance and long-term cyclability of intermediate temperature sodium-sulfur (IT-NaS) battery*, ChemElectroChem 8 (2021) 1156-1166
  19. S. Kelly, A.W. van de Steeg, A. Hughes, G.J. van Rooij, A. Bogaerts, *Thermal instability and volume contraction in a pulsed microwave N-2 plasma at sub-atmospheric pressure*, Plasma Sources Sci. Technol. 30 (2021) 055005
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29. M. Mas-Montoya, D. Curiel, J.K. Wang, B.J. Bruijnaers, R.A.J. Janssen, use of sodium diethyldithiocarbamate to enhance the open-circuit voltage of  $\text{CH}_3\text{NH}_3\text{PbI}_3$  perovskite solar cells, *Sol. RRL* 5 (2021) 2000811
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31. D.B. O'Neill, S.K. Frehan, K.J. Zhu, E. Zoethout, G. Mul, E.C. Garnett, A. Huijser, S.H. C. Askes, *Ultrafast photoinduced heat generation by plasmonic HfN nanoparticles*, *Adv. Opt. Mater.* 9 (2021) 2100510
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#### 2.4 Publications in other journals and conference proceedings: 3

1. M. Tsampas, R. Sharma, S. Welzel, M.C.M. van de Sanden, (Invited) *Plasma activated electrocatalysis for nitrogen fixation*, ECS Meeting Abstracts [239<sup>th</sup> ECS Meeting with the 18<sup>th</sup> International Meeting on Chemical Sensors (IMCS) May 30, 2021-June 3, 2021] MA2021-01 [2021] 878
2. X.Y. Chen, A. Shaur, M. Grofulovic, A.J. Wolf, W.A. Bongers, F.J.J. Peeters, G.J. Zhang, H. Bouwmeester, M.C.M. van de Sanden, *Plasma-enhanced high temperature solid-oxide electrolysis cells: the search for synergy*, ECS Meeting

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## 2.5 Professional publications: 6

1. A.P.H. Goede, *In Memoriam Paul Crutzen (1933-2021)*, Ned. Tijdschr. Natuurk. 87 (2021) 11
2. A.P.H. Goede, *In Memoriam Paul Crutzen (1933-2021)*, Eur. Phys. News 52 (2021) 11
3. A.W. van de Steeg, A.P.H. Goede, *CO<sub>2</sub> als grondstof voor synthetische kerosine en het belang van plasma voor hergebruik van CO<sub>2</sub>*, NEVAC Blad 59 (2021) 18-22
4. K.J. Schouten, M.C.M. van de Sanden, et al., *ECCM National Agenda. A Dutch Research, Development Innovation Agenda for a CO<sub>2</sub>-neutral industry based on renewable energy*, (2021) p.52
5. P. Lund, C. Schmidt, M.C.M. van de Sanden, et al., *A systemic approach to the energy transition in Europe.*, SEPEA Evidence Review Report, Science Advice for Policy by European Academies (2021) p.192
6. V. Koelman, *Een onnodige hypothese*, Ned. Tijdschr. Natuurk. 87 (2021) 28

## 2.6 Invited lectures at conferences and meetings: 33

1. Dutch Physics Council, 2021/01/27, The Hague, Netherlands, A. Bieberle-Hütter, *A facility for the characterization of materials for the energy transition*
2. NWO adviescommissie: Tafel Natuurkunde, 2021/02/11, The Hague, Netherlands, A. Bieberle-Hütter, *A facility for the characterization of materials for the energy transition*
3. NWO adviescommissie: Tafel Scheikunde, 2021/02/11, The Hague, Netherlands, A. Bieberle-Hütter, *A facility for the characterization of materials for the energy transition*
4. Debat Visies op de mogelijkheden en beperkingen van waterstof in Nederland, D66 Werkgroep Energie en Klimaat, 2021/01/22, Online, Netherlands, M.C.M. van de Sanden, *Waterstof. Opschaling H<sub>2</sub> en waar liggen de kansen?*
5. COST 18234 Workshop of Action, Working group 5 meeting, 2021/02/16, e-conference, Belgium, A. Bieberle-Hütter, *Understanding the effect of surface states in photo-electrochemical water oxidation by multiscale modeling*
6. Raad voor Chemie / Dutch Chemistry Council, 2021/02/18, The Hague, Netherlands, A. Bieberle-Hütter, *A facility for the characterization of materials for the energy transition*
7. Heat-to-Fuel workshop: Heat-to-Fuel interfaces to advanced Power-to-Gas and Power-to-Liquids Technologies (e-fuels), 2021/03/08, Online, Austria, M.C.M. van de Sanden, A.J. Wolf, A.W. van de Steeg, F.J.J. Peeters, A. Goede, G.J. van Rooij, M.N. Tsampas, S. Welzel, *The KEROGREEN CO<sub>2</sub> plasma route to CO and alternative fuels*
8. JP AMPEA Workshop on Carbon Capture, Utilisation and Storage (CCUS) 2021, 2021/03/10-2021/03/11, Paris, France, S. Welzel, *KEROGREEN - A plasma-based approach for CO<sub>2</sub> neutral fuel production*
9. ACS National Meeting Spring 2021 Macromolecular Chemistry: the second century, 2021/04/05-2021/04/30, Online, USA, M.N. Tsampas, R. Sharma, S. Welzel, M.C.M. van de Sanden, *Plasma activated electrocatalysis for nitrogen fixation*
10. European Energy Research Alliance (EERA) Joint Programme on Energy Storage (EERA-JP-ES), 2021/04/14, Online, Germany, S. Er, *Materials for hybrid energy storage - creating an ecosystem for innovation*

11. IPP ITED Seminar Ringberg 2021, 2021/04/20, Online Heidelberg, Germany, M.C.M. van de Sanden, *Plasma activated electrocatalysis for novel approaches for electrosynthesis of base molecules. Plasma technology in relation to the energy transition*
12. ICTP Workshop on Physics and Chemistry of Solid/Liquid Interfaces for Energy Conversion and Storage, 2021/05/24-2021/05/28, Online, Italy, A. Bieberle-Hütter, *Identifying the limiting processes at electrochemical interfaces: from experimental data to multiscale modeling*
13. 47<sup>th</sup> EPS Conference on Plasma Physics, 2021/06/21-2021/06/25, Sitges, Spain, P. Viegas, L. Vialetto, A.J. Wolf, F.J.J. Peeters, T.W.H. Righart, P.W.C. Groen, W.A. Bongers, M.C.M. van de Sanden, P. Diomede, *Insight into contraction dynamics of microwave plasmas for CO<sub>2</sub> conversion: modeling and experiments*, 14.303
14. Mission Innovation Round Table 2021, Bridging Gaps between Ideas, 2021/06/22, Online, Belgium, S. Er, *Innovations and markets to accelerate clean energy innovation*
15. 48<sup>th</sup> IUPAC World Chemistry Congress 2021 Solving Global Challenges with Chemistry, 2021/08/13-2021/08/20, Online, Canada, M.N. Tsampas, *Exsolution process a novel bottom up catalyst fabrication method for energy applications*
16. 19<sup>th</sup> International Conference on Plasma Physics and Applications (CPPA 2021), 2021/08/31-2021/09/03, Bucharest, Romania, E.R. Mercer, C.F.A.M. van Deursen, G. Raposo, P.W.C. Groen, W.A. Bongers, M.C.M. van de Sanden, F.J.J. Peeters, *Preheating and quenching in CO<sub>2</sub> microwave plasma reactors*, I-07
17. Future Energy Solution conference 2021 - Green Gas session, 2021/09/13-2021/09/14, Lappeenranta, Finland, A. Goede, A.W. van de Steeg, A. Pandiyan, M.N. Tsampas, DIFFER Team, *KEROGREEN aviation grade fuel from recirculated CO<sub>2</sub>*
18. PLATHINIUM 2021 Plasma Thin film International Union Meeting, 2021/09/13-2021/09/17, Online, France, M.C.M. van de Sanden, *Renewable energy driven non-equilibrium chemistry: Plasma chemistry as the special case*
19. 6<sup>th</sup> H2020 CCUS and Alternative fuels workshop EU-CINEA, 2021/09/23-2021/09/24, Brussels, Belgium, A. Goede, *KEROGREEN concept & consortium*
20. 240<sup>th</sup> ECS Meeting 2021, 2021/10/10-2021/10/14, Online, Orlando, USA, K. Nijmeijer, *Next generation ion exchange membranes for electrochemical polymer membrane processes*, I01C-1123
21. AVS 67<sup>th</sup> International Symposium and Exhibition, 2021/10/25-2021/10/28, Online, USA, F. Peeters, *CO<sub>2</sub> conversion in microwave plasma: can we bring it to an industrial scale?*
22. Precision Fair 2021, 2021/11/10-2021/11/11, Den Bosch, Netherlands, A. Bieberle-Hütter, *A facility for the characterization of materials for the energy transition*
23. Solvay workshop Plasma technology and other green methods for nitrogen fixation 2021, 2021/11/15-2021/11/17, Brussels, Belgium, M.N. Tsampas, R. Sharma, V. Kyriakou, F.J.J. Peeters, S. Welzel, M.C.M. van de Sanden, *Synergistic combination of plasma activation and electrocatalysis for nitrogen fixation by water*
24. Solvay workshop Plasma technology and other green methods for nitrogen fixation 2021, 2021/11/15-2021/11/17, Brussels, Belgium, M.C.M. van de Sanden, M.N. Tsampas, R. Sharma, V. Kyriakou, F.J.J. Peeters, S. Welzel, *Plasma electrochemical conversion processes using ion conducting membrane: a playground for detailed studies on the role of surface charge and electric fields on plasma-electrocatalytic processes*
25. TechConnect EUROPE 2021, Energy Sustainability Track, 2021/11/17, Malmo, Sweden, S. Er, *Automating the screening of small molecules for grid-scale energy storage*
26. Aarhus Technical University management meeting, 2021/11/18, Aarhus, Denmark, A. Goede, *Future directions in research on power-to-X for sustainable chemicals and fuels*
27. JP ES Joint Workshop on EU Clean Energy Transition: Perspectives and Challenges for Energy Storage, 2021/11/24, Ulm, Germany, A. Goede, *ORACLE Novel routes and catalysts for synthesis of ammonia as alternative renewable fuel*
28. Euromembrane 2021, 2021/11/28-2021/12/02, Copenhagen, Denmark, K. Nijmeijer, *Membranes à la carte*, Plenary
29. Dutch Israeli renewable energy conversion and storage mini symposium, 2021/01/13, Online, Eindhoven, R.A.J.

Janssen, *Developments in solar research*

30. Emerging Topics Workshop at Faculty of Engineering Friedrich-Alexander Universität, 2021/11/11, Erlangen, Germany, R.A.J. Janssen, *Progress and challenges in organic and perovskite solar cells and photodiodes*
31. Brightlands Polymer Days 2021, 2021/11/07-2021/11/09, Veldhoven, Netherlands, R.A.J. Janssen, *Material and device design for highly efficient organic solar cells*, Keynote
32. 3<sup>rd</sup> Indian Materials Conclave and 32<sup>nd</sup> Annual General Meeting of MRSI, 2021/12/20-2021/12/23, Online, Chennai, India, R.A.J. Janssen, *Material and device design for highly efficient organic solar cells*, Keynote
33. CHAINS 2021 (CHemistry As INnovating Science), 2021/12/07-2021/12/08, Veldhoven, The Netherlands, S. Er, *Automating the screening of electroactive compounds for grid-scale energy storage*, Focus Session Dec 8th

## 2.7 Invited seminars: 9

1. Seminar at Computational Center for Energy Research (CCER), 2021/01/14, Eindhoven, Netherlands, M. Sorkun, *Artificial Intelligence-aided Discovery of 2D Materials*
2. BML Munjal University, 2021/02/19, Online, India, R.A.J. Janssen, *Organic and perovskite photovoltaics, photodiodes and photoelectrochemical devices*
3. Seminar Ecole CentraleSupélec de Engineering, 2021/03/23, Paris, France, M.C.M. van de Sanden, *The transformation of the (chemical) industry because of deep decarbonization and electrification*. Plasma technology in relation to the energy transition
4. 22<sup>nd</sup> International Summer School on Vacuum, Electron and Ion Technologies VEIT, 2021/09/20-2021/09/24, Sozopol, Bulgaria, G.J. van Rooij, *Electrification and circularity - a plasma chemistry perspective*, PR-3
5. 22<sup>nd</sup> International Summer School on Vacuum, Electron and Ion Technologies VEIT, 2021/09/20-2021/09/24, Sozopol, Bulgaria, F.J.J. Peeters, *Converting CO<sub>2</sub> using microwave plasma: improvements for application on an industrial scale*, PR-5
6. 22<sup>nd</sup> International Summer School on Vacuum, Electron and Ion Technologies VEIT, 2021/09/20-2021/09/24, Sozopol, Bulgaria, M.C.M. van de Sanden, *Plasma activated electrocatalysis for nitrogen fixation*, PR-14
7. Zernike Colloquium, University of Groningen, 2021/12/02, Online, Netherlands, R.A.J. Janssen, *Organic and perovskite photovoltaic cells and photodiodes*
8. 21<sup>st</sup> EIRES Lunch lecture (Eindhoven Institute for Renewable Energy Systems), 2021/12/10, Eindhoven, Netherlands, F. Sapountzi, *Dealing with the materials challenge of PEM water electrolysis*
9. International Summer School on Advanced Materials for Energy (ISSAME 2021), 2021/12/13-2021/12/14, Online, France, S. Er, *Automating the virtual discovery of molecules for energy storage*

## 2.8 Oral and poster presentations at (international) conferences and meetings: 33

1. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, M.C. Sorkun, V. Koelman, S. Er, *An artificial intelligence-aided virtual screening recipe for two-dimensional materials discovery*, Oral PT2A.4
2. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, L. Vialetto, P. Viegas, S. Longo, P. Diomede, *Monte Carlo flux simulations of electrons in CO<sub>2</sub>*, Oral PT6B.3
3. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, K. George, T. Khachatryan, M. van Berkel, V. Sinha, A. Bieberle-Hütter, *Understanding the effect of surface states on photoelectrochemical water oxidation*, Oral PW3B.3

4. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, R. Hamans, M. Parente, A. Baldi, *Super-resolution mapping of a chemical reaction driven by plasmonic near-fields*, Oral PW3B.4
5. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, A. Hughes, A.W. van de Steeg, X. Tu, G.J. van Rooij, *An investigation into the formation of NO in air plasma as a prelude to plasma-assisted catalysis*, Poster P08.014
6. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, A. Silva, Q. Ong, G. Berden, A.W. van de Steeg, G.J. van Rooij, *A vibrational funnel to CO<sub>2</sub> dissociation – interpreting free electron laser experiments by modelling*, Oral PT6B.4
7. Physics Veldhoven 2021, 2021/01/18-2021/01/20, Veldhoven, Netherlands, A.W. van de Steeg, P. Viegas, A. Silva, F. Peeters, P. Diomede, M.C.M. van de Sanden, G.J. van Rooij, *Transport and chemistry in CO<sub>2</sub> microwave plasma unraveled by in-situ laser scattering*, Oral PT6B.5
8. 24<sup>th</sup> PSI Conference 2020, 2021/01/25-2021/01/29, Jeju, Korea, G.J. van Rooij, A. Gallo, D. Doller, N. Fedorczak, S. Brezinsek, C. Desgrange, D. Douai, S. Ertmer, J.P. Gunn, T. Loarer, et al., *Evolution of W sources in the changeover between D to He at WEST*, Poster FP4-029(E)
9. 9<sup>th</sup> ICT.OPEN / Dutch Digital Conference 2021, 2021/02/08-2021/02/10, Online, Netherlands, D. Mullaj, M.C. Sorkun, S. Er, *ChemPlot: A python library for chemical space visualization*, Poster
10. CECAM workshop Materials Design for Energy Storage and Conversion: Theory and Experiment (Flagship workshop), 2021/03/02-2021/03/05, Lausanne, Switzerland, V. Sinha, D. Sun, E.J. Meijer, T.J.H. Vlugt, A. Bieberle-Hütter, *A multiscale modelling approach to elucidate the mechanism of the oxygen evolution reaction at the hematite-water interface*, Oral
11. CTC Meeting 2021 (KNCV division Computational and Theoretical Chemistry (CTC)), 2021/03/24, The Hague, Netherlands, V. Sinha, D. Sun, E.J. Meijer, T.J.H. Vlugt, A. Bieberle-Hütter, *A multiscale modelling approach to elucidate the mechanism of the oxygen evolution reaction at the hematite-water interface*, Oral
12. ACS National Meeting Spring 2021 Macromolecular Chemistry: the second century, 2021/04/05-2021/04/30, Online, USA, H. Ma, R. Sharma, S. Welzel, M.C.M. van de Sanden, M.N. Tsampas, W. Schneider, *Models and observations of plasma-catalytic nitrogen oxidation*, Oral
13. 28<sup>th</sup> IAEA Fusion Energy Conference (FEC 2020), 2021/05/10-2021/05/15, Vienna, Austria, G. Ciraolo, A. Gallo, A. Sepetys, N. Fedorczak, Y. Marandet, H. Bufferand, J.P. Gunn, P. Tamain, R. Guirlet, G.J. van Rooij, et al., *Interpretative modelling of impurity transport and tungsten sources in WEST boundary plasma*, Poster TH/P4-12
14. Online ORACLE Kick-Off meeting, 2021/05/25, Online, Netherlands, M.N. Tsampas, *Plasma-assisted electro-catalytic reactor*, Oral
15. E-MRS Spring Meeting 2021, 2021/05/31-2021/06/04, Online, France, Q. Liang, G. Brocks, X.Q. Zhang, A. Bieberle-Hütter, *Monolayer nitrides doped with transition metals as efficient catalysts for water oxidation: the singular role of nickel*, Oral
16. 12<sup>th</sup> European Symposium on Electrochemical Engineering 2021, 2021/06/14-2021/06/17, Leeuwarden, Netherlands, G. Zafeiropoulos, P. Varadhan, L. Kamphuis, H. Johnson, S. Kinge, M.C.M. van de Sanden, M.N. Tsampas, *Solid electrolyte based photoelectrochemical cells for solar hydrogen production*, Oral 207
17. 12<sup>th</sup> European Symposium on Electrochemical Engineering 2021, 2021/06/14-2021/06/17, Leeuwarden, Netherlands, V. Kyriakou, D. Neagu, M.N. Tsampas, *Redox exsolution: a novel bottom-up catalyst preparation method for efficient electrochemical energy applications*, Oral 573
18. 12<sup>th</sup> European Symposium on Electrochemical Engineering 2021, 2021/06/14-2021/06/17, Leeuwarden, Netherlands, R.K. Sharma, H.C. Patel, S. Welzel, M.C.M. van de Sanden, M.N. Tsampas, *Plasma activated electrolyser for nitrogen fixation by water*, Oral 215

19. 12<sup>th</sup> European Symposium on Electrochemical Engineering 2021, 2021/06/14-2021/06/17, Leeuwarden, Netherlands, U. Mushtaq, R.K. Sharma, S. Welzel, M.C.M. van de Sanden, M.N. Tsampas, *Development of proton conducting solid oxide electrolysis cell electrode tailored for CO<sub>2</sub> reduction into useful products*, Poster 268
20. 12<sup>th</sup> European Symposium on Electrochemical Engineering 2021, 2021/06/14-2021/06/17, Leeuwarden, Netherlands, S. Kandhasamy, M.C.M. van de Sanden, M.N. Tsampas, *Challenges behind long-term cyclability of intermediate temperature sodium sulfur (IT-NaS) battery*, Poster 506
21. Minisymposium Materials for Energy on DIFFER and University of Twente (UT) collaborative work on 'Pulsed Laser Deposition for Energy Applications', 2021/07/20, Eindhoven, Netherlands, P. Varadhan, M.C.M. van de Sanden, M.N. Tsampas, *Making hydrogen out of thin air*, Oral
22. Minisymposium Materials for Energy on DIFFER and University of Twente (UT) collaborative work on 'Pulsed Laser Deposition for Energy Applications', 2021/07/20, Eindhoven, Netherlands, N. Puthuval Prasad, M.C.M. van de Sanden, A. Bieberle-Hütter, *Bi-Ferrite for water splitting*, Oral
23. 74<sup>th</sup> Gaseous Electronics Conference (GEC 2021), 2021/10/04-2021/10/08, e-conference, USA, A. Sovelas da Silva, Q. Ong, A.W. van de Steeg, V. Guerra, G.J. van Rooij, *The case for CO<sub>2</sub> decomposition in plasma through vibrational activation: a closer look at the vibrational kinetics in a high excitation regime*, Oral DT22.00006
24. 74<sup>th</sup> Gaseous Electronics Conference (GEC 2021), 2021/10/04-2021/10/08, e-conference, USA, L. Vialetto, P. Viegas, A.W. van de Steeg, G.J. van Rooij, J. van Dijk, S. Longo, P. Diomede, *Insight into chemistry and transport in CO<sub>2</sub> microwave discharges through comparisons between simulations and experiments*, Oral DT24.00008
25. 74<sup>th</sup> Gaseous Electronics Conference (GEC 2021), 2021/10/04-2021/10/08, e-conference, USA, A.W. van de Steeg, L. Vialetto, P. Viegas, A.F. Silva, A. Hughes, O. Biondo, P. Diomede, M.C.M. van de Sanden, G.J. van Rooij, *Thermalization between electrons and heavy species in CO<sub>2</sub> microwave plasmas revealed by Thomson scattering*, Oral UF22.00007
26. 74<sup>th</sup> Gaseous Electronics Conference (GEC 2021), 2021/10/04-2021/10/08, e-conference, USA, C. Fromentin, T. Silva, T.C. Dias, E. Baratte, O. Guaitella, O. Biondo, V. Guerra, *Kinetic Mechanisms in CO<sub>2</sub>-N<sub>2</sub> plasmas*, Oral DT22.00007
27. 74<sup>th</sup> Gaseous Electronics Conference (GEC 2021), 2021/10/04-2021/10/08, e-conference, USA, M. Altin, P. Viegas, L. Vialetto, S. Longo, P. Diomede, *Integrating the Fokker-Planck approach to vibrational kinetics in a self-consistent N<sub>2</sub> plasma chemistry model*, Oral PR24.00007
28. 240<sup>th</sup> ECS Meeting 2021, 2021/10/10-2021/10/14, Online, Orlando, USA, R.R. Jacquemond, R. Geveling, K. Nijmeijer, A. Forner-Cuenca, *Identifying performance-defining metrics of ion exchange membranes for non-aqueous redox flow batteries*, Oral A01-0119
29. 240<sup>th</sup> ECS Meeting 2021, 2021/10/10-2021/10/14, Online, Orlando, USA, R.R. Jacquemond, R. Geveling, K. Nijmeijer, A. Forner-Cuenca, *Non-solvent induced phase separation: a versatile synthetic method for high performance redox flow battery electrodes*, Oral A01-0115
30. Applied Computational Sciences (ACOS) symposium 2021, 2021/11/03, Eindhoven, Netherlands, X. Zhou, S. Er, *High-throughput computational screening of organic electrode materials for Li-ion batteries*, Online Poster and Pitch #20
31. ECCM Research Day 2021, 2021/11/11, Eindhoven, Netherlands, M.C.M. van de Sanden, *Introduction ECCM Electrochemical conversion and materials*, Oral
32. ECCM Research Day 2021, 2021/11/11, Eindhoven, Netherlands, X. Zhou, S. Er, *High-throughput computational screening of organic electrode materials for Li-ion batteries*, Poster
33. Aarhus Technical University ORACLE First Progress meeting, 2021/11/19, Aarhus, Denmark, M.N. Tsampas, *Plasma-assisted electro-catalytic route toward sustainable ammonia synthesis*, Oral

## 2.9 Positions, including editorships: 37

1. M.C.M. van de Sanden, Member of the EASAC Energy Steering Panel (European Academies) (since 2014)
2. M.C.M. van de Sanden, Fellow of the International Plasma Chemistry Society (since 2017)
3. M.C.M. van de Sanden, Senior Advisory Board Member of Plasma Sources: Science and Technology (since 2005, Senior since 2014)
4. M.C.M. van de Sanden, International Advisory Board for the journal Plasma Processes and Polymers (since 2002)
5. M.C.M. van de Sanden, Member of the Scientific Advisory Board of the CNR Institute of Nanotechnology, Salento (since 2018)
6. M.C.M. van de Sanden, Member Advisory Committee of International Conference on Reactive Plasmas (ICRP) (since 2014)
7. M.C.M. van de Sanden, Member table discussions Solliance Day 2021 Vision on energy transition
8. M.C.M. van de Sanden, Member International Scientific Advisory Committee and Chair International Summer School on Vacuum, Electron and Ion Technologies VEIT (since 2015)
9. M.C.M. van de Sanden, Member Board NWO Domain Applied and Engineering Sciences (AES, in Dutch: TTW) (since 2021)
10. M.C.M. van de Sanden, Board member and NWO liaison (waarnemer) TKI nieuw Gas, Groningen (since 2014)
11. M.C.M. van de Sanden, Member of the Editorial Board of the Journal "Applied Sciences" (since 2016)
12. M.C.M. van de Sanden, Parttime professorship in the Department EIRES (since 2011 after fulltime since 2000)
13. M.C.M. van de Sanden, KNAW committee member Raad voor Natuur- en Technische Wetenschappen (RNTW) (since 2017)
14. M.C.M. van de Sanden, Member of the Royal Netherlands Academy of Arts and Sciences (KNAW) (since 2013)
15. M.C.M. van de Sanden, Co-chair KNAW Klimaatklankbordgroep (since 2021)
16. M.C.M. van de Sanden, Organizer 2021 ACS Spring Meeting Session: Recent Advances in Plasma-Enhanced Catalysis
17. M.C.M. van de Sanden, Member Scientific Board Netherlands Energy Research Alliance (NERA) (since 2017)
18. M.C.M. van de Sanden, Chair Advisory Committee ECCM (Elektrochemische Conversie & Materialen) of Dutch Top Research Sections Energy, Chemistry and HTSM (since 2017)
19. M.C.M. van de Sanden, Editorial Board member of the journal Global Transitions (since 2018)
20. S. Welzel, Lecturer Course series Optical Diagnostics, techniques and applications at Eindhoven University of Technology: Infrared Absorption Spectroscopy: Theory, techniques & applications (since 2014)
21. A.P.H. Goede, Member of the Technical Advisory Board of the German BMBF KOPERNIKUS 10 year Programme P2X (since 2016)
22. A.P.H. Goede, Coordinator European EERA Joint Programme Energy Storage, Subprogram 2 Chemical Energy Storage (since 2017)
23. A.P.H. Goede, Coordinator European EU Horizon2020 project KEROGREEN (since 2017)
24. A.P.H. Goede, Fellow of European Physical Society (since 2011)
25. A.P.H. Goede, Expert H2020 STORies project Storage Research Infrastructure Ecosystem (2021-2025)
26. S. Er, Guest Editor for MDPI Batteries Special Issue on 'Material Design and Development for Redox Flow Batteries II'
27. S. Er, Member Expert Panel BATTERY2030+ BIG-MAP Stakeholder Initiatives Call
28. S. Er, Member Scientific Committee NWO Talent Programme Veni ENW
29. S. Er, Member Scientific Committee Applied Computational Science online symposium (ACOS 2021), Nov 3, 2021, Eindhoven, Netherlands
30. A. Bieberle-Hütter, Member Advisory board Raad voor de Scheikunde (Dutch Chemistry Council) (since 2020)

31. A.Bieberle-Hütter, Member User Commission ECCM Electrochemical Conversion Materials (since 2020)
32. A.Bieberle-Hütter, Subprogram leader: Materials Science, European joined program AMPEA (since 2019)
33. A.Bieberle-Hütter, Member Scientific committee ECCM Research Day 2021, Nov 11<sup>th</sup>, Eindhoven, Netherlands
34. A.Bieberle-Hütter, Leader Work Group "Microscale and Continuum Modeling" of COST Action Computational materials sciences for efficient water splitting with nanocrystals from abundant elements (2019-2023)
35. A. Bieberle-Hütter, Member editorial board of the Dutch physics.org website (since 2018)
36. A. Bieberle-Hütter, Co-organizer 2-Day JP AMPEA Workshop on Carbon Capture, Utilisation and Storage (CCUS) 2021, March 10-11
37. G.J. van Rooij, International Scientific Advisory Committee International Summer School on Vacuum, Electron and Ion Technologies VEIT (since 2015)

## 2.10 Publications aimed at the general public: 0

## 2.11 Book (chapters): 0

## 2.12 Public events and Industry contacts: 4

1. S. Er, *Automating the virtual screening of small molecules for energy storage*, Schrödinger Materials Science Virtual Summit 2021, 2021/02/16, Online, USA
2. M.C.M. van de Sanden, *De rol van duurzame chemie in een CO<sub>2</sub> neutrale infrastructuur in 2050*, 2021/03/15, Koninklijke Hollandsche Maatschappij der Wetenschappen 'Diligentia', The Hague, Netherlands
3. M.C.M. van de Sanden, *Pitch innovaties voor groene waterstof in energiesysteem van de toekomst*, InnovatieExpo 2021: Verbinden. Versnellen. Versterken, Sessie Aanjagers van Technologie: versnellen de transitie, 2021/04/08, Zaandam, Netherlands
4. M.C.M. van de Sanden, *NWO-I: DIFFER in a nutshell, differ(ent) kinds of energy hosted by Tech@Workplacepride*, 2021/11/18, Online, Netherlands

## 2.13 Awards: 6

1. G. Aalbers, Second prize KNCV Gouden Spatel 2021 for best Higher Education Chemistry thesis, 2021/10/14
2. S. Er, 2021 William A. Goddard Medal - for outstanding performance and outlasting contributions to computational materials science
3. F. Peeters, 2021 AVS PSTD Young Investigator Award (AVS Plasma Science and Technology Division), 2021/10/28
4. R.K. Sharma, H. Patel, U. Mushtaq, V. Kyriakou, G. Zafeiropoulos, F.J.J. Peeters, S. Welzel, M.C.M. van de Sanden, M.N. Tsampas, Energy Spotlight in 2021, 2nd issue of ACS Energy Letters: Advances in Plasma Activated Ammonia Synthesis for ACS Energy Lett. 6 [2021] 313–319, Plasma Activated Electrochemical Ammonia Synthesis From Nitrogen And Water
5. M.C. Sorkun, D. Mullaj, S. Er, 2021 ICT.OPEN Best Poster prize (Public voting Audience Poster Award), 2021/02/11
6. L. Vialotto, Student Excellence award at the 74th APS Gaseous Electronics Conference (GEC 2021), 2021/10/05

## 2.14 Media appearances: 18

1. 'Als je duurzame energie in de industrie wil gebruiken, heb je waterstof nodig', BOM, 2021/12/16, General coverage



2. *Te land, ter zee en in de lucht: gaan deze drie technologieën ons energieprobleem oplossen?*, De Volkskrant, 2021/02/12, Interview with T. Donné, A. Goede, M. Tsampas
3. *Waterstof staat op punt van doorbreken*, Akker van het Noorden, 2021/11/23, Interview with M.C.M. van de Sanden
4. KNAW-webinar: *Hoe maken we gebouwen CO<sub>2</sub>-neutraal?*, KNAW, 2021/09/14, General coverage
5. *'Dit vormt de basis voor groene brandstoffen'*, KIJK, 2021/08/31, Interview with A. van de Steeg
6. *Koolstofdioxide wordt grondstof voor duurzame brandstoffen*, De Ingenieur, 2021/08/03, Interview with A. van de Steeg
7. *No energy transition without a circular transition*, Innovation Origins, 2021/06/27, General coverage
8. *Aanjagers van Technologie: Rol van Waterstof*, Aanjagers van technologie (4TU), 2021/06/04, Interview with M.C.M. van de Sanden
9. Sluitstuk | *Microscopie met millimetergolven*, Cursor, 2021/06/03, General coverage
10. *Flying and sailing on synthetic kerosene*, IO, 2021/05/05, General coverage
11. BNR-#29-*Waterstofeconomie en Nederlandse machines en -onderdelen*, BNR, 2021/05/03, Interview with M.C.M. van de Sanden
12. *Waterstof wordt gehypet als oplossing voor alles*, ED, 2021/05/03, Interview with M.C.M. van de Sanden
13. *Binnen één generatie vliegen en varen op kunstkerosine*, FD, 2021/05/02, General coverage
14. *'Honingraat'-membraan maakt redox-flowbatterij efficiënter en goedkoper*, Technisch Weekblad (TW), 2021/03/03, General coverage
15. *Energie-opslag dé sleutel voor een geslaagde energietransitie*, Brabant Magazine, 2021/03/01, General coverage
16. *De energie voor de toekomst*, Nederlands Tijdschrift voor Natuurkunde (De Robbert), 2021/03/01, Interview with A. Bieberle-Hütter
17. *Regio Brainport is van groot belang bij milieukwesties en kan Sustainport worden*, ED, 2021/02/25, General coverage
18. *De keuzes op weg naar het energiesysteem van de toekomst*, Innovatie-estafette, 2021/02/24, Interview with M.C.M. van de Sanden



## **DIFFER**

Dutch Institute for Fundamental  
Energy Research  
De Zaale 20  
5612 AJ Eindhoven

P0 Box 6336  
NL-5600 HH Eindhoven  
The Netherlands

[info@differ.nl](mailto:info@differ.nl)  
[www.differ.nl](http://www.differ.nl)



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