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Mathematics and Statistics
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Employment

Senior Lecturer

Mathematics and Statistics
School of Physics, Maths and Computing
4 Jan 2018 → present

Associate Research Physicist

Princeton Plasma Physics Laboratory
United States
15 Aug 2015 → 15 Oct 2017

Postdoctoral Research Associate

Swiss Federal Institute of Technology Lausanne
Lausanne, Switzerland
1 May 2015 → 1 Aug 2015

Graduate Research Assistant

Swiss Federal Institute of Technology Lausanne
Lausanne, Switzerland
15 Feb 2011 → 1 May 2015

Research outputs

Development and optimisation of grid inserts for a preclinical radiotherapy system and corresponding Monte Carlo beam simulations

Fisk, M., Rowshanfarzad, P., Pfefferlé, D., Viana, M. F. D., Cabrera, J. & Ebert, M. A., 23 Jan 2024, In: Physics in Medicine & Biology.

Distribution transforms for guiding center orbit coordinates in axisymmetric tokamak equilibria

Benjamin, S., Järleblad, H., Salewski, M., Stagner, L., Hole, M. & Pfefferlé, D., Nov 2023, In: Computer Physics Communications. 292, 108893.

Dosimetric evaluation of an intraoperative radiotherapy system: a measurement-based and Monte-Carlo modelling investigation

Chin, M., Rowshanfarzad, P., Neveri, G., Ebert, M. A. & Pfefferlé, D., Jun 2023, In: Physical and Engineering Sciences in Medicine. 46, 2, p. 687-701 15 p.

Existence of global symmetries of divergence-free fields with first integrals

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Existence of global symmetries of divergence-free fields with first integrals

Perrella, D., Duignan, N. & Pfefferlé, D., 6 Mar 2023, (Unpublished) arXiv.

Euler-Poincaré reduction: a constrained variational problem framing spinning tops and fluids alike

Pfefferlé, D., Feb 2023.

Rectifiability of divergence-free fields along invariant 2-tori

Perrella, D., Pfefferlé, D. & Stoyanov, L., Aug 2022, In: Partial Differential Equations and Applications. 3, 4, 50.

Erratum: Whittle maximum likelihood estimate of spectral properties of Rayleigh-Taylor interfacial mixing using hot-wire anemometry experimental data [Phys. Rev. E 102 , 053107 (2020)]

Pfefferlé, D. & Abarzhi, S. I., 26 Jul 2022, In: Physical Review E. 106, 1, 019901.

Nifty use of cohomology for relative helicity formulae in magnetostatic

Pfefferlé, D., Feb 2022.

Numerical integration of particle orbits in discontinuous fields using VENUS-LEVIS and SPEC

Muir, D., Pfefferlé, D., Qu, Z., Hole, M. & Hegland, M., Feb 2022, In: Computer Physics Communications. 271, 108191.

Heavy impurity transport in tokamaks subject to plasma rotation, NTV and the influence of saturated ideal MHD perturbations

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Relative helicity formulae in magnetostatics from cohomological methods

Pfefferlé, D., Dec 2021.

Integrability of normal distributions Part 2: Neat foliations by manifolds with boundary

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Quasisymmetric magnetic fields in asymmetric toroidal domains

Sato, N., Qu, Z., Pfefferlé, D. & Dewar, R. L., 1 Nov 2021, In: Physics of Plasmas. 28, 11, 112507 .

Analysis of the isotropic and anisotropic Grad-Shafranov equation

Jeyakumar, S., Pfefferlé, D., Hole, M. J. & Qu, Z. S., 28 Oct 2021, In: Journal of Plasma Physics. 87, 5, 905870506.

A Stefan-Sussmann theorem for normal distributions on manifolds with boundary

Perrella, D., Pfefferlé, D. & Stoyanov, L., 10 Sept 2021, (Unpublished) 12 p. (arXiv).

Gauge freedom in magnetostatics and the effect on helicity in toroidal volumes

Pfefferlé, D., Noakes, L. & Perrella, D., 1 Sept 2021, In: Journal of Mathematical Physics. 62, 9, p. 1ENG 093505.

Modeling and measurement of energetic particle slowing down in Wendelstein 7-X

Lazerson, S. A., Pfefferlé, D., Drevlak, M., Smith, H., Geiger, J., Äkäsloppolo, S., Xanthopoulos, P., Dinklage, A., Ford, O., McNeely, P., Rust, N., Bozhenkov, S., Hartmann, D., Rahbarnia, K., Andreeva, T., Schilling, J., Brandt, C., Neuner, U., Thomsen, H. & Wolf, R. C., Sept 2021, In: Nuclear Fusion. 61, 9, 096005.

Combined plasma-coil optimization algorithms

Henneberg, S. A., Hudson, S. R., Pfefferlé, D. & Helander, P., Apr 2021, In: Journal of Plasma Physics. 87, 2, 905870226.

Longevity and power density of intermediate-to-deep geothermal wells in district heating applications

Hirvijoki, E., Pfefferlé, D. & Lingam, M., 25 Jan 2021, In: European Physical Journal Plus. 136, 1, 15 p., 137.

Modeling of neutral beam heating and current drive in Wendelstein 7-X

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Conference on Plasma Physics, EPS 2021; vol. 2021-June).

Whittle Maximum Likelihood Estimate of spectral properties of Rayleigh-Taylor interfacial mixing using hot-wire anemometry experimental data

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Why is it so hard to generate 3D MHD equilibria with smoothly nested flux surfaces?

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Coordinate parameterisation and spectral method optimisation for Beltrami field solver in stellarator geometry

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Energy and momentum conservation in the Euler-Poincaré formulation of local Vlasov-Maxwell-type systems

Hirvijoki, E., Burby, J. W., Pfefferlé, D. & Brizard, A. J., 12 Jun 2020, In: Journal of Physics A : Mathematical and Theoretical. 53, 23, 20 p., 235204.

Identification of an Optimized Heating and Fast Ion Generation Scheme for the Wendelstein 7-X Stellarator

W7-X Team & JET contributors, 17 Apr 2020, In: Physical Review Letters. 124, 15, 6 p., 155001.

Gauge freedom in magnetostatics and the effect on helicity in toroidal volumes

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Pfefferlé, D., 24 Jun 2019.

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Kaye, S. M., Battaglia, D. J., Baver, D., Belova, E., Berkery, J. W., Duarte, V. N., Ferraro, N., Fredrickson, E., Gorelenkov, N., Guttenfelder, W., Hao, G. Z., Heidbrink, W., Izacard, O., Kim, D., Krebs, I., La Haye, R., Lestz, J., Liu, D., Morton, L. A., Myra, J., & 71 others Pfefferlé, D., Podesta, M., Ren, Y., Riquezes, J., Sabbagh, S. A., Schneller, M., Scotti, F., Soukhanovskii, V., Zweben, S. J., Ahn, J. W., Allain, J. P., Barchfeld, R., Bedoya, F., Bell, R. E., Bertelli, N., Bhattacharjee, A., Boyer, M. D., Brennan, D., Canal, G., Canik, J., Crocker, N., Darrow, D., Delgado-Aparicio, L., Diallo, A., Domier, C., Ebrahimi, F., Evans, T., Fonck, R., Frerichs, H., Gan, K., Gerhardt, S., Gray, T., Jarboe, T., Jardin, S., Jaworski, M. A., Kaita, R., Koel, B., Kolemen, E., Kriete, D. M., Kubota, S., LeBlanc, B. P., Levinton, F., Luhmann, N., Lunsford, R., Maingi, R., Maqueda, R., Menard, J. E., Mueller, D., Myers, C. E., Ono, M., Park, J-K., Perkins, R., Poli, F., Raman, R., Reinke, M., Rhodes, T., Rowley, C., Russell, D., Schuster, E., Schmitz, O., Sechrest, Y., Skinner, C. H., Smith, D. R., Stotzfus-Dueck, T., Stratton, B., Taylor, G., Tritz, K., Wang, W., Wang, Z., Waters, I. & Wirth, B., 5 Jun 2019, In: Nuclear Fusion. 59, 11, 16 p., 112007.

Guiding-centre theory for kinetic-magnetohydrodynamic modes in strongly flowing plasmas

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Rigidity of MHD equilibrium states to smooth ideal motion

Pfefferlé, D. & Noakes, L., 28 Mar 2019.

Heavy impurity transport in tokamaks with plasma flows and saturated 3D perturbations

Neto, E., Graves, J. P., Raghunathan, M., Lanthaler, S., Pfefferlé, D., Cooper, W. A. & Sommariva, C., 2019.

Particle motion in 3D MHD equilibria versus relaxed states

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What may the experimental and numerical data tell us on properties of Rayleigh-Taylor interfacial mixing?

Pfefferlé, D. & Abarzhi, S., 9 Dec 2018.

Coordinate-free Grad-Shafranov equation on a Riemannian manifold with Killing field

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Differentiating the shape of stellarator coils with respect to the plasma boundary

Hudson, S. R., Zhu, C., Pfefferlé, D. & Gunderson, L., 29 Sept 2018, In: Physics Letters, Section A: General, Atomic and Solid State Physics. 382, 38, p. 2732-2737 6 p.

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Equivalent elastica knots

Brizard, A. J. & Pfefferlé, D., 12 Jul 2018, (Unpublished)

The VENUS-LEVIS orbit solver

Pfefferlé, D., 28 Jun 2018.

The effect of magnetic equilibrium on auxiliary heating schemes and fast particle confinement in Wendelstein 7-X

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Modelling of NSTX hot vertical displacement events using M3D-C1

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Algebraic motion of vertically displacing plasmas

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Raghunathan, M., Graves, J. P., Nicolas, T., Cooper, W. A., Garbet, X. & Pfefferlé, D., 9 Oct 2017, In: Plasma Physics and Controlled Fusion. 59, 12, 124002.

Overview of the JET results in support to ITER

JET contributors, 15 Jun 2017, In: Nuclear Fusion. 57, 10, 102001.

Modelling of advanced three-ion ICRF heating and fast ion generation scheme for tokamaks and stellarators
Faustin, J. M., Graves, J. P., Cooper, W. A., Lanthaler, S., Villard, L., Pfefferlé, D., Geiger, J., Kazakov, Y. O. & Eester, D. V., 13 Jun 2017, In: Plasma Physics and Controlled Fusion. 59, 8, 084001.

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The DEMO wall load challenge
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Hirvijoki, E., Brizard, A. J. & Pfefferlé, D., 1 Feb 2017, In: Journal of Plasma Physics. 83, 1, 595830102.

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Hirvijoki, E., Lingam, M., Pfefferlé, D., Comisso, L., Candy, J. & Bhattacharjee, A., 1 Aug 2016, In: Physics of Plasmas. 23, 8, 080701.

Fast particle loss channels in Wendelstein 7-X
Faustin, J. M., Cooper, W. A., Graves, J. P., Pfefferlé, D. & Geiger, J., 29 Jul 2016, In: Nuclear Fusion. 56, 9, 092006.

Effects of magnetic ripple on 3D equilibrium and alpha particle confinement in the European DEMO
Pfefferlé, D., Cooper, W. A., Fasoli, A. & Graves, J. P., 22 Jul 2016, In: Nuclear Fusion. 56, 11, 112002.

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Saturated ideal kink/peeling formations described as three-dimensional magnetohydrodynamic tokamak equilibrium states
Cooper, W. A., Brunetti, D., Duval, B. P., Faustin, J. M., Graves, J. P., Kleiner, A., Patten, H., Pfefferlé, D., Porte, L., Raghunathan, M., Reimerdes, H., Sauter, O. & Tran, T. M., 1 Apr 2016, In: Physics of Plasmas. 23, 4, 040701.

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Modelling of ICRF fast ion generation in 2D and 3D plasma configurations
Faustin, J. M., Graves, J. P., Cooper, W. A., Geiger, J. & Pfefferlé, D., 1 Jan 2016, *43rd European Physical Society Conference on Plasma Physics, EPS 2016*. Belgium: European Physical Society (EPS), Vol. 40A.

Applications of the SCENIC code package to the minority ion-cyclotron heating in wendelstein 7-X plasmas
Faustin, J. M., Cooper, W. A., Geiger, J., Graves, J. P. & Pfefferlé, D., 10 Dec 2015, *Radio Frequency Power in Plasmas: Proceedings of the 21st Topical Conference*. American Institute of Physics, Vol. 1689. 060003

Free boundary equilibrium in 3D tokamaks with toroidal rotation

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Impact of RMP magnetic field simulation models on fast ion losses

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Energetic ion dynamics and confinement in 3D saturated MHD configurations

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VENUS-LEVIS and its spline-Fourier interpolation of 3D toroidal magnetic field representation for guiding-centre and full-orbit simulations of charged energetic particles

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Modeling of ion-cyclotron resonant heating in Wendelstein 7-X equilibrium

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Tokamak MHD equilibria with 3D distortions

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Teaching units (UWA)

Introduction to Applied Mathematics

David Pfefferle
24/02/20 → ...

Mathematics Foundations: Specialist

David Pfefferle
27/08/18 → ...

Multivariable Calculus

David Pfefferle & Miccal Matthews
19/02/18 → ...

Radiation Physics and Dosimetry

Pejman Rowshan Farzad, Martin Ebert & David Pfefferle
29/02/20 → ...

Scientific and Industrial Modelling

David Pfefferle & Neville Fowkes
30/07/18 → ...

Topology and Analysis

David Pfefferle
25/07/22 → ...