

Dr Brian Daniel Appelbe

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Motivation

I wish to serve on the BPIF board in order to contribute to the development of High Energy Density Physics (HEDP) research in Europe. As a board member I will promote collaboration between researchers across Europe. I also have extensive collaborations with researchers in the USA which I will use to enhance links with European researchers. I have significant experience in Inertial Confinement Fusion (ICF) research which, given the recent breakthrough results at the NIF, I will use to promote the topics of HEDP and ICF to a larger audience. Finally, I intend to use my position as a board member to encourage novel research topics in HEDP such as applications of Quantum Computing to HEDP and Nuclear Processes in HEDP.

Qualifications

10/2007 – 06/2011 PhD Plasma Physics, Imperial College London
Thesis title: “Nuclear Fusion Reaction Kinetics and Ignition Processes in Z-Pinches”
Supervisor: Prof. Jeremy Chittenden Examiners: Prof. Steven Rose, Mr. Warren Garbett

Employment

01/2023 – present Research Fellow at Imperial College London
07/2011 – 12/2022 Research Associate at Imperial College London
I work on computational and theoretical research topics in Inertial Confinement Fusion and in High Energy Density Physics, including neutron spectroscopy, nuclear diagnostics, magnetized transport theory, burning plasma theory and pulsed neutron sources.

Academic Activity

- Undergraduate and Postgraduate teaching of Physics students at Imperial College London.
- Member of the US Department of Energy sponsored National Implosion & Stagnation Physics Working Group and National Diagnostics Working Group.
- Visiting researcher at Sandia National Laboratories and Los Alamos National Laboratory.
- Reviewer for many leading journals including *Physical Review Letters*, *Physics of Plasmas*, *Plasma Physics and Controlled Fusion*, *Nuclear Fusion*, *IEEE Transactions on Plasma Science*, *Europhysics Letters* and *Chaos, Solitons & Fractals*.
- Member of the American Physical Society and Institute of Physics.
- Provided expert evidence to UK Government inquiries on Nuclear Power and Emerging Technologies.

Relevant Publications

1. E Hartouni, A Moore, A Crilly, **B Appelbe**, et al, “Evidence for suprathermal ion distribution in burning plasmas”, *Nature Physics*, **19**, 72-77, (2023) <https://doi.org/10.1038/s41567-022-01809-3>
2. H Abu-Shawareb et al (Indirect Drive ICF Collaboration), “Lawson Criterion for Ignition Exceeded in an Inertial Fusion Experiment”, *Physical Review Letters*, **129**, 075001, (2022) <https://doi.org/10.1103/PhysRevLett.129.075001>
3. O Mannion, A Crilly, C Forrest, **B Appelbe**, et al, “Measurements of the temperature and velocity of the dense fuel layer in inertial confinement fusion experiments”, *Physical Review E*, **105**, 055205, (2022) <https://doi.org/10.1103/PhysRevE.105.055205>
4. A Crilly, **B Appelbe**, O Mannion, et al, “Constraints on ion velocity distributions from fusion product spectroscopy”, *Nuclear Fusion*, **62**, 126015, (2022) <https://doi.org/10.1088/1741-4326/ac90d5>
5. **B Appelbe**, A L Velikovich, M Sherlock, et al, “Magnetic field transport in propagating thermonuclear burn”, *Physics of Plasmas*, **28**, 032705, (2021) <https://doi.org/10.1063/5.0040161>
6. A Crilly, **B Appelbe**, et al, “The effect of areal density asymmetries on scattered neutron spectra in ICF implosions”, *Physics of Plasmas*, **28**, 022710, (2021) <https://doi.org/10.1063/5.0038752>



Dr. A. Casner (CEA CESTA)

I was involved as PI on NIF since 2011 and on OMEGA experiments since 20 years. I am Research Director at CEA. I have performed CEA indirect drive experimental campaigns relevant for the evolution and stabilization of the ablative Rayleigh—Taylor instability in ICF targets on the OMEGA laser. I worked as CEA experimental and diagnostics coordinator on LIL then LMJ facility from 2008 to 2017. I have been collaborating with LLE on the shock ignition concept from 2010 to 2020. I was PI of several NIF Discovery Science (DS) proposals devoted to the study of Highly nonlinear stage of the ablative Rayleigh-Taylor instability and collaborates with Drs Smalyuk and L. Masse among others. I am currently still the PI (or co-PI) of on-going NIF DS proposals devoted to the study of various seminal hydrodynamics instabilities, including the Landau-Darrieus instability and magnetized Kelvin-Helmholtz instability. I served in the Executive Committee of the NIF User Group from 2012 to 2016, and was elected from 2017 to 2021 as non-US researcher representative at Omega Laser User Group. After having been Deputy Director at Centre Lasers Intenses et Applications (CELIA), Bordeaux University from 2017 to 2020, I am currently Head of Service at CEA CESTA. I currently served as the LOC Chair of the 49th EPS Plasma Conference in Bordeaux, July 2023. I am also Technical Program Committee co-chair of the Inertial Fusion Science and Applications (IFSA) conference since 2020.

Motivations

As the time of resurgence of Inertial Fusion Energy worldwide, I would like to contribute to increase the outreach of this plasma field of research at European level. I am fully committed to get Europe to rise this challenge. Being part of the BPIF Board is a way to strengthen the visibility of ICF and High Energy Density research. I think that my international network and motivation in organizing conferences and international workshops could be beneficial for the whole BPIF plasma community.

Awards & Honors

- Landau-Spitzer Award 2020, with X. Ribeyre, W. Theobald and R. Betti
For major advancements of the shock ignition concept through collaborative experimental and simulation efforts in ICF research
- Prix Edouard Fabre 2017, for “*his outstanding contribution in the fields of Inertial Confinement Fusion, hydrodynamics instabilities and x-ray imaging diagnostics*”.
- Prix Le Monde de la Recherche Universitaire, 2004
- Invited speaker at the 2014 APS DPP Annual Meetings, IFSA (2013, 2017), the Fast Ignition Workshop (2011, 2006), and the EPS Conference on Plasma Physics (2017), 2nd Asia Pacific Conference on Plasma Physics, International Conference on High Energy Density Science (ICHED 2019)

Relevant papers since 2017

- 1) A. Casner et al, *From ICF to laboratory astrophysics: ablative and classical Rayleigh-Taylor instability experiments in turbulent-like regimes*. Nuclear. Fusion **59**, 032002 (2019).
- 2) A. Casner, *Recent progress in quantifying hydrodynamics instabilities and turbulence in Inertial Confinement Fusion and High Energy Density experiments*. Philosophical Transaction Royal Society A: 379 (2189), 20200021 (2021).
- 3) G. Rigon et al *Micron-scale phenomena observed in a turbulent laser-produced plasma*. Nature Communications **12** (1), 2679 (2021).
- 4) A.F.A. Bott et al
Inefficient magnetic-field amplification in supersonic laser-plasma turbulence. Phys. Rev. Lett. **127**, 175002 (2021).
- 5) G. Rigon et al, *Exploring the Atwood-number dependency of the highly nonlinear Rayleigh-Taylor Instability regime in High Energy Density conditions*. Phys. Rev. E **104** (4), 045213 (2021).

Evgeny Gelfer

born 24.11.1984 in Moscow, Russia

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Research interests: Quantum electrodynamics in ultra-strong fields, laser-plasma interaction at high intensities, radiation friction in strong laser fields, laser particle acceleration.

Education

2001 – 2011 – National Research Nuclear University "MEPhI", Department of theoretical physics, student, PhD student. **PhD thesis:** "Boost symmetry in Quantum field theory and pair creation", 2011

Work experience

2011 – 2017 National Research Nuclear University "MEPhI", Department of theoretical physics, senior lecturer, associate professor (docent).

2017 – present The Extreme Light Infrastructure ERIC, Dolni Brezany, Czech Republic, Researcher

Recent scientific activities

One of the primary topics of my recent research was the theoretical study of QED processes in strong laser fields. We considered the generation of QED cascades in colliding laser pulses and identified the optimal configuration, providing the lowest laser power for the launching the cascade for colliding pulses and in a general case [4]. We also described in details the emission of high energy gamma rays in thin foils irradiated by ultra-intense laser pulses and analyzed the Locally constant crossed field approximation for a photon emission in a rotating electric field [5].

The second major topic was the study of interaction of strong laser pulses with plasma targets and its applications. We investigated the influence of radiation friction on longitudinal waves in dilute plasma [1] and ion acceleration in thin foil [3], and determined the opacity threshold for areal density of a thin foil, irradiated by a strong laser pulse [2].

List of publications (see also <https://scholar.google.com/citations?user=TLC-sV8AAAAJ&hl=en>)

1. E. Gelfer, N. Elkina, A. Fedotov, *Unexpected impact of radiation friction: enhancing production of longitudinal plasma waves*, Scientific Reports **8**, 6478 (2018)
2. E.G. Gelfer, A.M. Fedotov, O. Klimo, S. Weber, *Absorption and opacity threshold for a thin foil in a strong circularly polarized laser field*, Physical Review E **101**, 033204 (2020)
3. E.G. Gelfer, A.M. Fedotov, S. Weber, *Radiation induced acceleration of ions in a laser irradiated transparent foil*, New Journal of Physics **23** (9), 095002 (2021)
4. A.A. Mironov, E.G. Gelfer, A.M. Fedotov, *Onset of electron-seeded cascades in generic electromagnetic fields*, Physical Review A **104** (1), 012221 (2021)
5. E.G. Gelfer, A.M. Fedotov, A.A. Mironov, S. Weber, *Nonlinear Compton scattering in time-dependent electric fields beyond the locally constant crossed field approximation*, Physical Review D **106** (5), 056013 (2022)

Motivation to join the BPIF board: As a member of the BPIF board, I am going to promote the high field physics in Europe. One of the first steps in this direction could be establishing of the strong field section or at least satellite meeting at the annual European conference on plasma physics.

Piotr Rączka

Institute of Plasma Physics and Laser Microfusion, Warsaw, Poland



I am an assistant professor in the Institute of Plasma Physics and Laser Microfusion (IPPLM) in Warsaw, where I work on the problems of laser plasma physics, with particular emphasis on topics essential from the point of view of laser-driven nuclear fusion which are studied within a broad European collaboration under the aegis of the EUROfusion consortium. I have recently devoted much effort to study the problem of electromagnetic pulse generation as a result of laser-matter interactions at high laser intensities. Before 2008, when I moved to IPPLM, I worked in the University of Warsaw, first as a research assistant in the Institute of Geophysics (1981-1991), and then after a PhD in quantum field theory as an assistant professor in the Institute of Theoretical Physics (1991-2008). I am an author or coauthor of more than 50 papers on laser plasma physics, quantum field theory and nonlinear classical field theory. I am a member of the European Physical Society (IM100175), the Polish Physical Society, and the IEEE Nuclear and Plasma Society. I would like to promote broader participation of researchers and institutions from Poland and other Middle-Eastern European countries in the rapidly developing area of high-intensity laser-matter interactions and laser-driven inertial fusion, to take full advantage of the new experimental and computational possibilities becoming now available.

Some recent publications:

- [1] Paddock R W, von der Leyen M W, Aboushelbaya R, Norreys P A, Chapman D J, Eakins D E, Oliver M, Clarke R J, Notley M, Baird C D, Booth N, Spindloe C, Haddock D, Irving S, Scott R H H, Pasley J, Cipriani M, Consoli F, Albertazzi B, Koenig M, Martynenko A S, Wegert L, Neumayer P, Tchórz P, Rączka P, Mabey P, Garbett W, Goshadze R M N, Karasiev V V and Hu S X 2023 Measuring the principal Hugoniot of inertial-confinement-fusion-relevant TMPTA plastic foams *Phys. Rev. E* **107** 025206
- [2] Rączka P, Cikhardt J, Pfeifer M, Krása J, Krupka M, Burian T, Krûs M, Pisarczyk T, Dostál J, Dudźak R and Badziak J 2021 Measurement of strong electromagnetic pulses generated from solid targets at sub-ns kJ-class PALS laser facility *Plasma Phys. Control. Fusion* **63** 085015
- [3] Rączka P, Dubois J L, Hulin S, Rosiński M, Ryć L, Parys P, Zaraś-Szydłowska A, Terwińska D, Tchórz P, Badziak J, Ribolzi J, Tikhonchuk V and Wołowski J 2020 Target Charging, Strong Electromagnetic Pulse Emission and Proton Acceleration from Thin Foils at 10 TW IPPLM Femtosecond Laser Facility *Acta Phys. Pol. A* **138** 593–600
- [4] Consoli F, Tikhonchuk V T, Bardon M, Bradford P, Carroll D C, Cikhardt J, Cipriani M, Clarke R J, Cowan T E, Danson C N, De Angelis R, De Marco M, Dubois J-L, Etchessahar B, Garcia A L, Hillier D I, Honsa A, Jiang W, Kmetik V, Krása J, Li Y, Lubrano F, McKenna P, Metzkes-Ng J, Poyé A, Prencipe I, Rączka P, Smith R A, Vrana R, Woolsey N C, Zemaityte E, Zhang Y, Zhang Z, Zielbauer B and Neely D 2020 Laser produced electromagnetic pulses: generation, detection and mitigation *High Pow Laser Sci Eng* **8** e22, 1–59
- [5] Dubois J L, Rączka P, Hulin S, Rosiński M, Ryć L, Parys P, Zaraś-Szydłowska A, Makaruk D, Tchórz P, Badziak J, Wołowski J, Ribolzi J and Tikhonchuk V 2018 Experimental demonstration of an electromagnetic pulse mitigation concept for a laser driven proton source *Review of Scientific Instruments* **89** 103301, 1–8

CV - Francisco Suzuki-Vidal

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Research and professional experience

09/2021 – Present Lead Scientist, First Light Fusion Ltd.
10/2013 – 08/2022 Research Fellow (The Royal Society), Imperial College London, UK
07/2009 – 09/2013 Postdoctoral Research Associate, Imperial College London, UK

Education

2009 PhD in Plasma Physics, University of London, Imperial College London, UK
2004 BSc in Physics, Pontificia Universidad Catolica de Chile, Chile

Research achievements

- PI, LBS OMEGA laser proposal “*Angular momentum transport in disk-jet transitions*”, 2 proposals, 3 shot days (2021-2023)
- Collaborator, NLUF & LBS OMEGA laser proposals “*Driving compressed magnetic field to exceed 10 kT in cylindrical implosions*”, 3 shot days (2021-2023). Also accepted proposals at NIF (PI: M. Bailly-Grandvaux) and LMJ (PI: J.J. Santos)
- PI, laser experiments at Orion (UK, 1 campaign) and SG-II (China, 3 campaigns), co-PI at PALS (CZ, multiple campaigns).
- Lead on HED experiments at the MAGPIE pulsed-power facility (magnetised jets, bow shocks, magnetised implosions, proton acceleration).
- 12 invited talks at international conferences since 2010 (e.g. EPS, ICHED, HPLSE, HEDLA, IoP UK, DZP)
- Awards: Excellence in teaching, Faculty of Natural Sciences, Imperial (2015 & 2021). Fusion Science Center Award, HEDP Summer School, UCSD (2007).
- I am Member of the Institute of Physics (UK), the American Physical Society (US), and Fellow of the Royal Astronomical Society (UK)

5 selected publications since 2017

1. **F. Suzuki-Vidal** et al., “*First Radiative Shock Experiments on the SG-II laser*”, HPLSE **9**, e27 (2021)
2. G. Perez-Callejo et al. “*Cylindrical implosion platform for the study of highly magnetized plasmas at Laser MegaJoule*”, PRE **106**, 3 (2022)
3. M.V. del Valle, A. Araudo, **F. Suzuki-Vidal**, “*Adiabatic–radiative shock systems in YSO jets and novae outflows*”, A&A **660**, A104 (2022)
4. D. Garcia-Senz, P. Velarde, **F. Suzuki-Vidal** et al., “*Interaction of hemispherical blast waves with inhomogeneous spheres: probing the collision of a supernova ejecta with a nearby companion star in the laboratory*”, ApJ **871**, 2 (2019)
5. **F. Suzuki-Vidal** et al., “*Counterpropagating Radiative Shock Experiments on the Orion Laser*”, PRL **119**, 055001 (2017)

Luca Volpe short CV

Departamento de Física (FAIAN), ETSI Aeronáutica y del Espacio
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Centro de Laseres Pulsados, Salamanca, Spain
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Born :09/10/1971 Milano (Italy)



Motivation

I have already served as member the first 4-year period from 2018-2022 and the last two years I served as a chair of the BP&IF Board of PPD-EPS. During my chair I have worked for consolidating and expanding laser-plasma physics community with several actions that are still on the way. One of the most important events occurred during my coordination of the Board was the “Ignition achievement” in Livermore laboratory during 2021, then confirmed at the End of 2022. Since then, I have run a series of Important initiatives to support the renewed Interest in the physics of laser-fusion and related topics in Europe. With this candidature I would like to offer my contribution for a “second round” by supporting and helping the EU community for this “exciting and expanding” period for the physics of laser-plasma. I personally believe that *networking and collaboration* among the different countries and Laboratories is today essential in order to advance our field and for this the main relevant actions are: (i) Networking (for example I am coordinating the HiPER+ initiative), (ii) EU projects (I involved (with responsibilities) in several EU projects: i.e EUROfusion, LaserLab), (iii) Theory and Experiments (I am PI of several experiments in leading facilities in EU and USA) and (iv) Training (I Am professor at the UPM Madrid, and I managed EU master programs in laser fusion).

Status

- Professor at the Physics department at the Polytechnique University of Madrid
- Researcher in Laser-Plasma physics and applications
- CLPU Scientific Advisor

Fields of Research

Extreme intensity, Ultra-Short laser matter interaction; Laser-driven particle and radiation sources and applications including Ion probing of extreme plasma; Laser-plasma and laser-particle diagnostics, advanced HRR diagnostics, Advanced Targetry for HRR; Laser Fusion: Laser-driven Shocks and highly compressed materials, Fast ignition scheme to inertial confinement approach to fusion; High Energy Physics and Warm Dense Matter; Laser-plasma numerical methods (PIC, kinetic scheme), Monte Carlo Simulation for charged particle and radiation beam transport.

Prizes, awards & assignments

- (2020-2024) Elected member of the Euro-Fusion Spanish scientific panel for Inertial Confinement Fusion Section
- (2020-2022) Elected Chair of the BF&IF Board at the EPS Plasma Physics Division
- (2019-2024) Elected Co-Chair of the Laserlab-Europe V Access Committee.
- (2019) Invited Member of the Institute of Fundamental physics and Mathematics @ the University of Salamanca.
- (2019-2023) Elected Member of BP&IF Board at the EPS Plasma Physics Division
- (2008) “Francesco Resmini” National Prize by national Institute Of Nuclear physics (INFN) for the best Italian PhD Thesis of 2008 in accelerator physics

Participation to scientific committees: CLPU, Eu X-FEL

Participation to editorial boards: HPLSE, APHB

Publications

Author of about 90 publications, 70 in JCR peer review journals and 20 in conference proceedings

Citations =900 h-index = 19; i-10 index =31

Scopus Author ID: 15926341000 <https://www.scopus.com/authid/detail.uri?authorId=15926341000>

ORCID ID <https://orcid.org/0000-0002-0385-498X>

Last 5 main publications:

1. Y. Arikawa, et al., “*Demonstration of efficient relativistic electron acceleration by surface plasmonics with sequential target processing using high repetition lasers*” Physical Review Research 5 (1), 013062 (2023) (Co-PI experiment)
2. S. Malko et al. “*Proton stopping measurements at low velocity in warm dense carbon*” Nature Communications 13 (1), 2893 (2022) (PI experiment group leader)
3. F. Mirani, et al., “*Integrated quantitative PIXE analysis and EDX spectroscopy using a laser-driven particle source*” Science advances 7 (3), eabc8660 (2021) (Co-Pi of the experiment)
4. JI Apiñaniz et al., “*A quasi-monoenergetic short time duration compact proton source for probing high energy density states of matter*” Scientific Reports 11 (1), 6881 (Group Leader)

EPS Beam Plasma & Inertial Fusion (BPIF) Section – Nomination

Dear members of the selection committee,

It is with great excitement that I send this nomination to be part of the EPS-BPIF Section board.

I have been an active researcher in HED physics by leading experiments with high-power lasers and pulsed-power drivers. My base of operation is the UK, however it has thrived only thanks to many international collaborations with a core of expertise from colleagues based in Europe. This is one of the main reasons why I am very eager in being part of this board, to continue growing and engaging with this very talented community.

I believe that I can make a strong contribution to fulfill the goals of the BPIF Section. Particularly, my recent transition from purely academic research to privately-funded ICF research can be very valuable to the present and future of this group, as the goal of fusion becomes more of a reality rather than an unreachable dream. I believe that the role of European physicists will be key in achieving this dream.

I look forward to hearing positive news from you.

Kind regards,

A handwritten signature in black ink, appearing to read 'F. Suzuki-Vidal'.

Francisco Suzuki-Vidal
First Light Fusion Ltd, UK