Francesco Volpe

Associate Professor of Applied Physics at Columbia University in the City of New York
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Education

2003 Ph.D. in Exp.Physics, Ernst Moritz Arndt Universität Greifswald (Germany), *Summa cum Laude* with a thesis at Max-Planck-Institut für Plasmaphysik (IPP), Garching (Germany).

1998 "Laurea" (B.Sc.) in Physics, University of Pisa (Italy), *110 points out of 110, cum Laude* with a thesis at ENEA Frascati (Italy).

Post-doctoral and academic appointments

2015 -date	*Associate Professor*	Dept Appl. Physics & Appl. Mathem., Columbia Univ., New York, U.S.A.
2012 -15	*Assistant Professor*	Dept Appl. Physics & Appl. Mathem., Columbia Univ., New York, U.S.A.
2009 -11	*Assistant Professor*	Engineering Physics Dept, University of Wisconsin, Madison, U.S.A.
2008	*Staff Physicist*	Max-Planck-Institut für Plasmaphysik (IPP), Garching, Germany
2006 -08	*Visitor/Post-doc*	General Atomics, San Diego, U.S.A.
2006	*Adv. Training Sch.*	Max-Planck-Institut für Plasmaphysik (IPP), Greifswald, Germany
2004 -05	*Physicist*, Fircroft	UKAEA Fusion, Culham, U.K.
2002 -04	*Post-doc*	UKAEA Fusion, Culham, U.K.

Selected honors and awards

2015 Excellence in Fusion Engineering Award, Fusion Power Associates, USA

2012 Visiting Assistant Professorship in Kyoto University, Japan

2011 DOE Early Career Award, USA

2003 Otto-Hahn Medal (thesis prize of the Max-Planck Gesellschaft), Germany

Research

Plasma Physics and Magnetic Confinement Fusion. Stellarators. Microwave Heating and Diagnostics of Plasmas. Metamaterials. Optics. Magnetohydrodynamic Instabilities and their Control.

Main accomplishments (in chronological order from old to new):

- first Electron Bernstein Wave (EBW) emission diagnostic of electron temperature profiles, i.e. first extension of Electron Cyclotron Emission (ECE) to overdense plasmas
- first heat waves generated by EBW heating and measured by EBW emission
- first ray tracing code including mode conversions and 3D stellarator geometry
- with H.P. Laqua *et al.*: first EBW current drive by Ordinary-eXtraordinay-Bernstein mode conversion
- first diagnostic (spinning mirror) for rapid angular scans of EBW emission
- international collaboration on optimization of ITER upper launchers for Electron Cyclotron Current Drive (ECCD) stabilization of Neoclassical Tearing Modes (NTMs)
- first stabilization of NTM by ECCD modulated and radially aligned by means of oblique ECE
- first stabilization, by ECCD and magnetic perturbations, of a locked mode that would otherwise have caused a disruption

- first metamaterial lens of reverse chromatic aberration by design
- first non-destructive ("spiraling") correction of error fields at high plasma pressure
- first generation of rotational transform by tilted toroidal field planar coils

Teaching and advising

- **Teaching/Taught** "Plasma Physics I", "Applied Physics Laboratory" and "Physics of Fluids" at Columbia University, "Introduction to Plasmas" and "Nuclear Instrum. Laboratory" at UW-Madison.
- **Lectured** on Plasma Waves and Heating at the IPP Summer University on Plasma Physics and Fusion Research 2008, Garching (Germany), and at the Mirai Summer School 2012, Suzukaji (Japan), and on Locked Modes at the ITER International School 2017, Aix-en-Provence (France).
- **Current group**: 1 PhD student and 5 undergraduates.
- **Previously advised**: 2 scientists, 3 unfunded visitors and collaborators, 3 post-docs, 2 PhD thesis, 11 MSc students and 21 undergraduates.

Service

- **Member** of National Stellarator Coordination Committee.
- Invited **Leader** of International Tokamak Programmatic Activities (ITPA) Working Group 11, "Control of Locked Modes".
- Regular **referee** for *Nucl. Fusion* and for *Plasma Phys. Control. Fusion.* Ad hoc referee for other 18 journals and book publishers.
- **Reviewer** for Chilean National Commission for Scientific and Technological Research, Czech Science Foundation, Humboldt Stiftung (Germany), Italian Scientists and Scholars of North America Foundation, Research Foundation Flanders (FWO), Swiss National Science Foundation, U.S. Department of Energy.
- **Conferences** organized: 16th, 18th, 19th, 20th and 21st Workshop on MHD Stability Control, 2011, 2013, 2014, 2015 and 2016 (Prog. Committee). 15th Workshop on MHD Stability Control, 2010 (Local Organizer). 4th Int. Conf. Frontiers Diagn. Technologies, 2016 (International Adv. Board).
- **Outreach**: science advisor to "Blackout" movie (2016-date), guide to Columbia Plasma Physics Laboratory (2012-date), judge in Science Fairs (Wisconsin, 2010-11), "Scientist in the Classroom" (California, 2006-07), guide to the MAST and COMPASS tokamaks (Culham, U.K., 2004-05).

Publication summary

11 invited talks at international conferences
3 journal articles under review
65 journal articles published
133 conference papers, reports and other publications

h-index = 14 and >600 citations according to ISI Web of Knowledge (`http://www.researcherid.com/rid/D-2994-2009`)
h-index = 18 and >900 citations according to Google Scholar.

Full publication list available at `http://www.columbia.edu/~fv2168/Publ/lPub.pdf`