Stefano ATZENI: Curriculum Vitae

Born in Rome, Italy, October 20, 1955
Italian Citizen
Married, two daughters

Laurea in Ingegneria Nucleare (Dr. in Nucl. Engineering), University of Rome, May 30, 1979; summa cum laude ("110/110 e lode").

Compulsory Military Service as Artillery officer from May 1981 to August 1982.

Professional experience

- February 2017 –:
  Full Professor of Experimental Physics, member of Dipartimento S.B.A.I. (Department of Fundamental and Applied Sciences for Engineering); Facoltà di Ingegneria Civile e Industriale, Università di Roma "La Sapienza"; associate member of Consorzio Nazionale Interuniversitario per le Scienze Fisiche della Materia (CNISM, formerly INFM).

  2013: National Qualification (Abilitazione Scientifica Nazionale) as Full Professor in Experimental Physics of Matter (02/B1) and in Theoretical Physics of Matter (02/B2).

- 2000 – January 2017 Associate Professor of Physics, member of the Department of Fundamental and Applied Sciences for Engineering (formerly Department of Energetics); Facoltà di Ingegneria e Industriale (formerly Facoltà di Ingegneria), Università di Roma "La Sapienza"; associate member of Consorzio Nazionale Interuniversitario per le Scienze Fisiche della Materia (CNISM, formerly INFM).

- August 1982 – February 2000:
  Researcher of ENEA, Ente per le Nuove Tecnologie, l'Energia e l'Ambiente, Nuclear Fusion Division, Frascati. (May 1994 – February 2000: *Assistant to the Director* of the Nuclear Fusion Division, for the studies on Heavy Ion driven inertial fusion)

- December 1980 – August 1982: "perfezionando in Fisica" at Scuola Normale Superiore, Pisa.

- January 1980 – November 1980: M.I.T., Dep. of Physics, visiting Scientist.

- October 1979 – January 1980: Max-Planck-Institut fuer Plasmaphysik - Projektgruppe fuer Laserforschung, Garching, Germany (EURATOM contract).

Awards and honors

- Recipient of the **Edward Teller Medal of the Fusion Energy Division, American Nuclear Society** for "pioneering research and leadership in Inertial Fusion Sciences and Applications" (Sept. 2001).

- **Fellow of the American Physical Society** (2010) for "For contributions to the theory and simulation of inertial confinement fusion, leading to advances in ignition schemes, energy gain models, implosion symmetry and implosion stability."

Other appointments

- March – May 1988: guest scientist, IBM-ECSEC (European Centre for Sci. and Eng. Computing).
- September – December 1993: Guest Professor - Research Scholar at the Institute of Laser Engineering, Osaka University, Japan.
- May – June 1995: Guest Professor at the Politecnico di Torino.
- 1998: associate to CERN (LHC-EET Group)
- July 2007: Academic Visitor at Department of Physics, Imperial College, London.
- May 2008 – 2013: HiPER project: (High Power Laser Energy Research Facility):

member of the Project Management Committee; manager of Work Package 9 (Requirements analysis for fusion programme); principal investigator for the participation of the Italian consortium CNISM.
- December 2016: Chercheur Invité, Laboratorie pour l'Utilisation des Laser Intenses (CNRS), Ecole Polytechnique and UPMC, Paris.

Projects Principal Investigator
- Principal investigator of Italian Universities national programmes (PRIN) on laser-driven plasmas (PRIN 2001: 2001-3, PRIN2005: 2006-7; PRIN2009: 2011-13; PRIN2012: 2014-17),
  responsible officer for ENEA partecipation in an INTAS project (1995-7),
  responsible scientific officer for participation of Dep. of Energetics to national programmes (FIRB 2003: 2006-9; PRIN 2007: 2008-2010),
  Leader of the Sapienza-SBAI in the Eurofusion, Inertial fusion Energy research proposal CfPAAWP17AIFE, on "Preparation and Realization of EuropeanShock Ignition Experiments"

- July 2011: participant into the NIC Study (National Ignition Campaign Study, Lawrence Livermore National Laboratory) on invitation by the NIC director.

Scientific Societies:

- **Chair (2006-2008)** of the Beam-Plasma and Inertial Fusion (BPIF) section of the Plasma Physics Division of the European Physical Society. Member of the BPIF Board (2002-2004 and 2004-2008).

- **Member** of the Italian Physical Society (since 1987).
- Member of the European Physical Society (since 1988).
- **Fellow** of the American Physical Society (since 2010); member since 2006.

Conference Committees:

Member of the Advisory Board, Scientific Committee, Programme Committee, or Organising Committee of many international conferences, including "EPS Plasma Physics Conference" (2003, 2006, 2015), "International Symposium on Heavy-Ion Inertial Fusion" (1993-2004); "International Conference on Inertial Fusion Sciences and Applications" (1999, 2001, 2013); "International Conference on Mathematics and Computation, Reactor Physics and Environmental Analysis" (1999), "Workshop on Fast Ignition of Fusion Targets", "Workshop on Direct-Drive ICF and Fast Ignition" (2009, 2012, 2013, 2016, 2017; Chairman in 2013), "International Conference on Ultraintense Laser Interaction Sciences (2009), FisMat2013 and FisMat2015, Italian National Conference on the Physics of Matter (2013, 2015)

Selection, Evaluation, Award Committees:

- Member of User selection panels for the Laser facilities User selection panels for the Laser facilities of Limeil-Valenton (1993-1998), of LULI-Ecole Polytechnique (2000-),
- **Chairman** (from 2014), member (2010 -) of the Scientific Advisory Committee of the PETAL Laser (CEA, Bordeaux)
- Member of the Programme Advisory Committee for Atomic and Plasma Physics, GSI – FAIR Project, (2005 –)
- Invited "Expert" member to the JASON Winter Study on the National Ignition Campaign (La Jolla, CA, Jan 14-16, 2009).
- Member of the Panel of High Energy Density Hydrodynamics, DoE Joint Research Needs Workshop (RENEW), Washington, DS, Nov. 15-18, 2009.
- **Evaluator** for Italian (PRIN, FIRB, CIVR, SIR), French (CNRS), Russian, UK (Royal Society), US (DoE, NNSA), Latvia projects on plasma physics, Swiss projects on supercomputing, Estonian projects.

- Member of the Jury of Institute Universitaire de France (Junior Jury 2014; Senior Jury 2015)
- Member of the APS-EPS Landau Spitzer Award Committee (2016)
- Member of the Teller Medal Award Committee (2003 –)

Editorial Boards

- **Member of Editorial Board of** High Energy Density Physics (2005–).
- **Member of Editorial Board of** Plasma Physics and Controlled Fusion (2006–).
- **Co-Editor of Europhysics Letters** (April 2011–)

Referee for more than 10 international journals, including the most important plasma physics journals (Nuclear Fusion, Physics of Plasmas, Journal of Computational Physics, Fusion Engineering and Design, Laser and Particle Beams, Fusion Technology; Nuclear Instruments and Methods, Nuovo Cimento, European Physical Journal D, J. Physics B, Comptes Rendu del'Academie des Sciences), Nature Physics).

Publications:
- Book A. Atzeni and J. Meyer-ter-Vehn: "The Physics of Inertial Fusion" [Oxford University Press (2004 and 2009), Chinese translation: Science Press, Beijing (2008)], > 1150 citations (Google Scholar)
- more than 110 papers in refereed international journals (many single-authored, including review papers and papers on invitation),
- 8 book chapters,
- more than 50 papers in conference proceedings,
- series of lecture notes; several laboratory reports,
- co-editor of three conference proceeding;
- editor of the physics section of *Enciclopedia Treccani* (2010)

Invited speaker at 50 International Conferences on Fusion, Plasma Physics, and Supercomputing; including plenary speaker at EPS2000, IFSA2001, EPS 2009, ICCP8-2013.

Lecturer at International Summer Schools in Italy (Erice, 2000, 2003, 2011, 2013; 2015); Germany (Darmstadt, 1998), France (Cargese NATO school, 1994), Pakistan (Nathiagali College, PAEC-ICTP-UNESCO, 1988), Switzerland (IBM Institute, 1988), UK (SUSSP, Glasgow, 2011), Greece (2013, 2014)

Seminars:
Topical Lecturer on Inertial Fusion at the IACPM, Beijing, China, June 1997, and at several Italian post-graduate schools; 30 seminars (or series of seminars) on invitation at foreign institutions (in France, Germany, Russia, Japan, UK, China, USA).

Recent Scientific collaborations:
with Max-Planck-Institut-fuer-Quantenopotik (1995 – 2005); GSI-Darmstadt (HIDIF Study Group, 1995-'99); LULI-Ecole Polytechnique (1995-); Universidad de Castilla-La Mancha and Universidad Politecnica de Madrid (2000-2004, and 2007-2009); CEA-Bruyeres-Le-Chatel (2003-2004); Università di Milano-Bicocca, Università di Pisa and CNR, Pisa (Italian Ministry of University and Research Projects) (2001-); HiPER Project (2005-2013); University of Bordeaux (2010–); Lawrence Livermore National Laboratory: National Ignition Campaign Study (2011); M.I.T. (2013–)

Main scientific interests and expertise

- Physics of inertial confinement fusion: thermonuclear ignition, implosion symmetry and stability, fast ignition, non-DT fuels, target design; multidimensional numerical simulation.

- Physics of transport processes (plasma, fusion reaction products, radiation, laser-matter interaction) and equation of state of dense matter.

- Fluid-dynamics processes: shock waves, matter compression, instabilities (in particular, Rayleigh Taylor instabilities).

Main achievements

- Development of a general theory of ignition of inertial fusion targets (Atzeni and Caruso, 1984; Atzeni 1995, 2001) and of a comprehensive gain model (Atzeni 1995).

- Development of a multi-purpose 2D hydro-radiation nuclear code for inertial confinement fusion, for many years unique in the academic community (Atzeni, 1986; Atzeni et al 2005); continuously upgraded, used at several European laboratories and within European collaborations.

- First study of symmetry requirements for central ignition of fusion targets (Atzeni 1990,1991), with qualitative introduction of the concept of ignition margin: for many years a standard reference in the field.

- Determination of beam requirements for fast ignition (Atzeni 1999: scaling laws proposed in this paper are taken as a standard reference by the ICF community: 279 Scholar citations; Atzeni and Tabak 2005).

- Design of targets for fast ignition (Atzeni, Schiavi, Bellei 2007, Atzeni et al 2008,2009) and for shock ignition (Atzeni, Schiavi, Marocchino 2011, 2013), including first assessment of robustness.

- Study of (fast ignition) fusion targets with low tritium content (Atzeni and Ciampi 1997): identification of parameter space for targets do not requiring tritium breeding.

- Study of stability requirements for central ignition of fusion targets (Atzeni, Schiavi, Temporal 2004); systematic studies of Rayleigh-Taylor instability.

- Comprehensive presentation of inertial fusion physics (Book "The physics of inertial fusion, by Atzeni and Meyer-ter-Vehn, Oxford 2004 e 2009; Chinese translation 2008)

Teaching

In addition to advanced courses at International Schools, since the year 2000, he has delivered two-four courses each year (from 150 to 210 hours/year in total) to Engineering students, among the following:
For undergraduates:
- Physics I (Mechanics and Thermodynamics)
- Electromagnetism / Physics II
For MS students:
- Physics III (Elements of statistical and quantum physics, with applications)
- Principles of Atomic and Nuclear Physics
- Plasma Physics
From 2011-12 to 2014-15 he taught Principles of Atomic and Nuclear Physics as well as Plasma Physics.
From 2015-16: He teaches Modern Physics for Engineers, Plasma Physics and Nuclear Fusion, Physics I

(January 30, 2017)