

# CURRICULUM VITAE – Silvio Sergio Cerri

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## Employment

- 2021–present    Laboratoire J.-L. Lagrange, Observatoire de la Côte d’Azur, CNRS, Nice, France  
CNRS Research Scientist (Chargé de Recherche de Classe Normale)  
Group: *Turbulence Fluide et Plasmas*
- 2020–2021    Princeton University, Department of Astrophysical Sciences, USA  
Associate Research Scholar  
Group: *Astrophysical Plasmas* (with Prof. M.W. Kunz)
- 2017–2020    Princeton University, Department of Astrophysical Sciences, USA  
Postdoctoral Research Associate  
Group: *Astrophysical Plasmas* (with Prof. M.W. Kunz)
- 2016–2017    University of Pisa, Department of Physics, Italy  
Postdoctoral Researcher (“Assegnista di Ricerca”)  
Group: *Space Plasmas* (with Prof. F. Califano)
- 2015–2016    Max-Planck-Institut für Plasmaphysik (IPP), Garching, Germany  
Transitional Postdoc Position (6 months)  
Group: *Turbulence in Laboratory and Astrophysical Plasmas*
- 2012–2015    Max-Planck-Institut für Plasmaphysik (IPP), Garching, Germany  
Doctoral Researcher  
Group: *Turbulence in Laboratory and Astrophysical Plasmas* (with Prof. F. Jenko)

## Education

- Ulm University, Germany – Ph.D. in Physics *with highest honors* (“*magna cum laude*”), 12/2015  
Ph.D. Thesis: *Plasma Turbulence in the Dissipation Range – Theory and Simulations*  
Advisor: Prof. Frank Jenko
- University of Pisa, Italy – M.Sc. in Astrophysics *with highest honors* (“*110/110 cum laude*”), 3/2012  
Thesis: *Fluid Modeling of Kinetic Effects in Collisionless Magnetized Plasmas and Application to Solar Wind-Magnetosphere Interaction*  
Advisor: Prof. Francesco Califano
- University of Pisa, Italy – B.Sc. in Physics *with highest honors* (“*110/110 cum laude*”), 9/2009  
Thesis: *Physical features of the solar interior* (in Italian)  
Advisor: Prof. Scilla Degl’Innocenti

## Honors and Awards

- 2020    Invités scientifiques: “Visiting Research Fellow” at OCA & CNRS Lab. Lagrange, Nice, France (23 November – 22 December) [all fall/winter in-person visits to OCA canceled due to Covid-19]
- 2019    Invités scientifiques: “Visiting Research Fellow” at OCA & CNRS Lab. Lagrange, Nice, France (1–30 November)
- 2015    Prize “Vincenzo Ferraro” in Space Plasma Physics
- 2012–15    International Helmholtz Graduate School for Plasma Physics (HEPP) Fellow c/o IPP Garching

## Public Codes

- DRAGON**: Diffusion Reacceleration & Advection of Galactic cosmic rays: **O**pen **N**ew code (Version 2-Beta);  
Project webpage: [The DRAGON Project](#).
- DRAGONCELLO**: cosmic-ray transport including a fully anisotropic diffusion tensor (Version 1.0);  
see: Cerri et al., JCAP 10:019 (2017). Repository: [github.com/sscerr/DRAGONCELLO](https://github.com/sscerr/DRAGONCELLO).
- eTF**: parallel (MPI) solver of the “extended Two-Fluid” plasma model equations (Version 1.0);  
see: Cerri et al., Phys. Plasmas 20, 112112 (2013). Repository: [github.com/sscerr/eTF](https://github.com/sscerr/eTF).

**Service**

Organizer of the “*Lagrange Seminars*” at the Observatoire de la Côte d’Azur [Nov 2021 – present]

Organizer of the “*Astroplasmas Seminars*” at the Department of Astrophysical Sciences, Princeton University [Jun 2020 – Aug 2021; see also [astroplasmas.com](http://astroplasmas.com)]

Member of LOC for *1st JPP Frontiers in Plasma Physics Conference*, Spineto, Italy (2017)

Member of LOC for *Space Plasmas Working Meeting*, Pisa, Italy (2017)

Member of SOC for *HEPP session* at Annual DPG Meeting, Berlin, Germany (2014)

Referee for *Astronomy & Astrophysics*, *Journal of Plasma Physics*, *Physics of Plasmas*, *Frontiers in Astronomy and Space Sciences*, *Frontiers in Physics*, *The European Physical Journal Plus*

**Competitively Obtained HPC Time**

[2018/19] **PRACE** (grant n.2017174107): Co-PI, 60M CPU-hrs on Marconi-KNL for *Eulerian and lagrangian plasma simulations of kinetic turbulence* (*NOTICE*: I could not be PI because I am not affiliated with an European institution, but I defined the scientific objectives and most of technical details of the project)

[2016/17] **ISCRA** (grant n.HP10BEANCY): Co-PI, 20M CPU-hrs on Marconi-KNL for *Kinetic turbulence in collisionless plasma* (*NOTICE*: I was not designed as PI of this large-size allocation for career-stage reasons, but I entirely defined the scientific objectives and technical details of the project)

[2016/17] **ISCRA** (grant n.HP10C04BTP): PI, 4M CPU-hrs on GALILEO for *Response to an external forcing in hybrid-kinetic plasma turbulence*

[2012/13] **HPC Student Award**: PI, 320k CPU-hrs on FERMI for *Profiling and optimization of a 3D code for anisotropic two-fluid models*

[2019/20] **ISCRA** (grant n.HP10B10ALD): Co-I, 9M CPU-hrs on Marconi-KNL for *Magnetic reconnection: a multi-model analysis*

[2017/18] **NASA-HEC**: Co-I, 1M SBUs on PLEIADES for *Kinetic Turbulence and Ion Heating in the Solar Wind*

[2016/17] **LRZ-HPC** (grant n.PR74VI): Co-I, 30M CPU-hrs on SuperMUC for *Kinetic simulations of astrophysical and solar plasma turbulence*

[2012/13] **ISCRA** (grant n.HP10AT2EHV): Co-I, 16M CPU-hrs on FERMI for *Multiscale Plasma Simulations*

[2011/12] **ISCRA** (grant n.HP10AONY05): Co-I, 10M CPU-hrs on FERMI for *Nonlinear 3D dynamics of magnetized plasmas driven by shear flows*

**Selected Publications**

1. Cerri S. S., Grošelj D., Franci L., *Kinetic plasma turbulence: recent insights and open questions from 3D3V simulations*, *Front. Astron. Space Sci.* **6**, 64 (2019). (*Invited “Perspective” Article*)
2. Cerri S. S., *Finite-Larmor-radius equilibrium and currents of the Earth’s flank magnetopause*, *J. Plasma Phys.* **84**, 555840501 (2018). (*“Featured Article” by JPP*)
3. Cerri S. S., Kunz M. W., Califano F., *Dual Phase-space Cascades in 3D Hybrid-Vlasov-Maxwell Turbulence*, *Astrophys. J. Lett.* **856**, L13 (2018).
4. Cerri S. S., Gaggero D., Vittino A., Evoli C., Grasso D., *A signature of anisotropic cosmic-ray transport in the gamma-ray sky*, *J. Cosmol. Astropart. Phys.* **10**, 019 (2017).
5. Cerri S. S., Califano F., *Reconnection and small-scale fields in 2D-3V hybrid-kinetic driven turbulence simulations*, *New J. Phys.* **19**, 025007 (2017). (*“Highlights of 2017” by NJP*)
6. Cerri S. S., Henri P., Califano F., Del Sarto D., Faganello M., Pegoraro F., *Extended fluid models: pressure tensor effects and equilibria*, *Phys. Plasmas* **20**, 112112 (2013).

**Selected Talks**

- Jun 2022 Journées SF2A, Besançon, France **(Invited)**  
*Turbulent regimes in collisions of 3D Alfvén-wave packets*
- Dec 2020 AGU Fall Meeting [moved to e-conference because of COVID-19] **(Invited)**  
*Small-scale turbulence and energy conversion in kinetic plasmas*
- Oct 2020 AAPPS-DPP, 4<sup>th</sup> Asia-Pacific Conference on Plasma Physics **(Invited, Topical Plenary)**  
*Kinetic turbulence and ion heating in the solar wind*
- Jan 2020 Max-Planck/Princeton Center (MPPC) Workshop, Göttingen, Germany **(Invited)**  
*Ion heating in low- $\beta$  kinetic plasma turbulence*
- Jul 2019 6<sup>th</sup> Vlasovia Conference, Strasbourg, France **(Invited)**  
*Reconnection and ion heating in low- $\beta$  plasma turbulence*
- Jun 2019 Waves Côte d'Azur, Nice, France **(Invited)**  
*The good, the bad and the ugly: kinetic plasma turbulence in a 3D3V phase space*
- Jul 2018 11<sup>th</sup> Plasma Kinetics Working Meeting, Wolfgang Pauli Institute, Vienna, Austria **(Invited)**  
*3D hybrid-kinetic turbulence and phase-space cascades in a  $\beta = 1$  plasma*
- Apr 2018 Max-Planck/Princeton Center (MPPC) Workshop, Princeton University, USA **(Invited)**  
*3D hybrid-Vlasov-Maxwell turbulence: reconnection, spectral anisotropy and dual phase-space cascades*
- May 2017 1<sup>st</sup> JPP Frontiers in Plasma Physics Conference, Spineto, Italy **(Invited)**  
*Magnetic reconnection as primary driver of the turbulent cascade below the ion gyroradius: hybrid-kinetic simulations*
- Jan 2016 Max-Planck/Princeton Center (MPPC) General Meeting, Berlin, Germany **(Invited)**  
*Subproton-scale cascades in driven hybrid-kinetic plasma turbulence*
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- Jun 2022 IRAP Seminar, Institut de Recherche en Astrophysique et Planétologie, Toulouse, France  
*When astroparticles meet plasma turbulence: micro-physics of cosmic-ray transport in the Galaxy*
- Nov 2019 Lagrange Seminar, Observatoire de la Côte d'Azur, Nice, France  
*Reconnection and ion heating in low- $\beta$  hybrid-kinetic plasma turbulence*
- Oct 2019 APS-DPP Annual Meeting, Ft. Lauderdale, Florida, USA (Contributed)  
*Reconnection and ion heating in low- $\beta$  hybrid-kinetic plasma turbulence*
- Dec 2018 AGU Fall Meeting, Washington, D.C., USA (Contributed)  
*Plasma turbulence in phase space: 3D-3V hybrid-Vlasov-Maxwell simulations*
- Nov 2018 APS-DPP Annual Meeting, Portland, Oregon, USA (Contributed)  
*Anisotropic phase-space cascades in 3D-3V hybrid-Vlasov-Maxwell simulations of plasma turbulence*
- Oct 2018 Arcetri Workshop on Plasma Astrophysics, Arcetri, Italy (Contributed)  
*Electron-only reconnection & cascades in phase space: recent results from hybrid-kinetic plasma turbulence*
- Oct 2016 Arcetri Workshop on Plasma Astrophysics, Arcetri, Italy (Contributed)  
*Spectra, reconnection and small-scale fields in forced 2D3V hybrid-Vlasov turbulence*
- Jun 2016 5<sup>th</sup> Vlasovia Conference, Copanello, Italy (Contributed)  
*Forced hybrid-kinetic turbulence in 2D3V*

**Teaching Experience**

- Fall 2018            Guest Lecturer, Dept. of Physics, University of Pisa  
 • “Fondamenti di Fisica dei Plasmi e dei Fluidi”  
 (Principles of fluid and plasma physics; ~ 20 students)
- Springs 2016–2017    Guest Lecturer, Dept. of Physics, University of Pisa  
 • “Plasmi B” (kinetic plasma theory; ~ 15 students)
- Falls 2014–2016     Guest Lecturer, Dept. of Physics, University of Pisa  
 • “Plasmi A” (fluid plasma theory; ~ 15 students)
- Springs 2013–2014    Teaching/Laboratory Assistant c/o IPP Garching  
 • “Plasmaphysikpraktikum” (plasma physics lab; 4 students)

**Mentoring and Supervision**

- M.Sc. Thesis:    S. De Camillis (U. Pisa; 2013), E. Lazzeretti (U. Pisa; 2016), A. Moirano (U. Pisa; 2018)  
 Ph.D. Thesis:    F. Finelli (co-supervision with F. Califano, U. of Pisa; *in course*)

**Outreach**

- 2017            “*The turbulent world of plasmas: from astrophysics to fusion reactors*”, Kuriltai 2017, Pisa, Italy
- 2015            “*Plasmas and the Universe*”, Toastmaster International, Santa Monica Club 21, Los Angeles, USA
- 2013            “*The interaction between the solar wind and the Earth’s magnetosphere*”, Kuriltai 2013, Trento, Italy
- 2010            Guide for the public exhibition “*La natura si fa in 4*”, an exhibition for mid- and high-school students on the four forces of nature, Pisa, Italy (organized by the National Institute of Nuclear Physics)
- 2010–11        Guide for the public exhibition “*La notte dei ricercatori*”, a guided tour through the history, research, and experiments developed within the Department of Physics at the University of Pisa
- 2009            Guide for the “*Ludoteca Scientifica*”, an exhibition and laboratory of basic physics experiments for students ranging from mid to high schools (11–18 years-old range)

**Involvement in International Collaborations**

- 2020–present    Member of several **ESA Solar Orbiter working groups**  
 (Turbulence **WG**, Kinetic Physics **WG1 WG2**, Reconnection **WG**, Multiscale Physics **WG**)
- 2014–2018        Member of the numerical support team for **ESA THOR mission proposal** (M4 class)
- 2013–2021        Member of **Max-Planck/Princeton Center for Plasma Physics (MPPC)**
- 2011–2014        Member of the **Space Weather Integrated Forecasting Framework (SWIFF)** team (FP7 project)

**References**

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