

Vlasovia Workshop program

Monday, January 29, 2024

09:00 - 09:45 Registration, opening remarks (Califano, Manfredi, Landi, Valentini)

Early Morning Session (chair: Francesco Califano)

09:45 – 10:30 **Keynote Lecture:** Alexander Schekochihin: *In search of universality: towards a statistical mechanics of collisionless plasma.*

10:30 – 11:00 Coffee break

Late Morning Session (chair: Francesco Califano)

11:00 – 11:30 Maxime Lesur (invited): *Dynamics of interacting phase-space vortices in the two species, 1D Vlasov-Poisson system*

11:30 – 11:45 Luca Barbieri: *Temperature inversion in a non-homogeneous collisionless plasma with a thermal boundary: the temporal coarse-graining method*

11:45 – 12:00 Alessandro Zocco: *Electromagnetic trapped electron mode in general geometry.*

12:00 – 12:30 Davide Manzini (invited): *Cascade-Dissipation Balance in space plasma.*

12:30 - 14:30 Lunch

Early Afternoon Session (chair: Giulia Cozzani)

14:30 – 15:00 Francesco Pegoraro (invited): *Testing the validity of plasma kinetic theory*

15:00 – 15:15 Sofia Cristofaro: *Numerical simulations of positron plasma cooling in Penning-Malmberg trap*

15:15 – 15:30 Robert Ewart: *Non-thermal particle acceleration and power-law tails via relaxation to universal Lynden-Bell equilibria*

15:30 – 15:45 Alain Ghizzo: *Collisionless heating in Vlasov Plasma induced by filamentation aspects.*

15:45 - 16:15 Coffee break

Late Afternoon Session (chair: Giulia Cozzani)

16:15- 16:45 Pierfrancesco Di Cintio (invited): *Instabilities in anisotropic systems with long-range interactions*

16:45 – 17:00 Antoine Gagnebin: *Landau damping for Vlasov-type system*

~~17:00 – 17:15 Jörg Büchner: *Current sheet formation and reconnection in collisionless turbulent plasmas*~~

Tuesday, January 30, 2024

Early Morning Session (chair: Simone Landi)

09:15 – 10:00 **Keynote Lecture:** Julia Stawarz: *Sub-proton-scale turbulent dynamics and energy conversion: Recent observations and paths forward.*

10:00 – 10:15 G rard Belmont: Kinetic effects in thin layers: effects on jump conditions and discontinuity properties.

10:15 – 10:30 Luca Franci: *Reconnection-driven agyrotropic electron distributions in turbulent plasmas and the role of electron velocity shears.*

10:30 – 11:00 Coffee break

Late Morning Session (chair: Simone Landi)

11:00 – 11:30 Paul Cassak (invited): *A Kinetic Entropy Approach to Quantifying Dynamics of Plasmas out of Local Thermodynamic Equilibrium.*

11:30 – 11:45 Giulio Ballerini: *Experimental evidence of the role of non-gyrotropy in magnetopause equilibrium.*

11:45 – 12:00 Jerome Perez: *Isochrony and gravitational collisionless plasmas.*

12:00 – 12:30 Giulia Cozzani (invited): *Interplay of Magnetic Reconnection and Current Sheet Kink Instability in the Earth's Magnetotail.*

12:30 - 14:30 Lunch

Early Afternoon Session (Chair: Katharina Kormann)

14:30 – 15:00 Domenico Trotta (invited): *Phase space transport in the shock-turbulence interaction.*

15:00 – 15:15 Oreste Pezzi: *Emergent phase-space complexity in turbulent nearly-collisionless plasmas*

15:15 – 15:30 Luca Pezzini: *Fully kinetic simulations of proton instabilities driven by anisotropic two-component velocity distributions observed by Parker Solar Probe.*

15:30 – 15:45 Lapo Casetti: *Symplectic coarse graining approach to the dynamics of long-range interacting systems.*

15:45 - 16:15 Coffee break

Late Afternoon Session (Chair: Katharina Kormann)

16:15 – 16:45 Emanuele Papini (invited): *Turbulent dissipation in collisionless plasmas: insights from kinetic simulations.*

16:45 – 17:00 Beniamino Sanò: *Characterizing Magnetic Reconnection Regions Using Unsupervised Machine Learning Techniques On MMS Data.*

17:00 – 17:15 Paul Anjan: *Testing the validity of plasma kinetic theory.*

17:15 – 17:30 .

Wednesday, January 31, 2024

Early Morning Session (Chair: Giovanni Manfredi)

09:15 – 10:00 **Keynote Lecture:** Steven Cowley: *Fine-scale instability and Macroscopic equations.*

10:00 – 10:15 Daniele Del Sarto : *Self-organization due to phase synchronization of Fourier modes: an application to the suppression of low frequency tokamak turbulence by amplification of zonal flows in presence of energetic particles*

10:15 – 10:30 Cary Forest (invited): *Kinetic aspects to the axisymmetric mirror as a fusion reactor*

10:30 – 11:00 Coffee break

Late Morning Session (Chair:Giovanni Manfredi)

11:00 – 11:30 Plamen Ivanov (invited): *Theory and applications of linear gyrokinetics in a curved magnetic field*

11:30 – 11:45 Martin Masek: *Transform method for the Vlasov equation*

11:45 – 12:00 Yingzhe Li: *Canonical momentum based numerical schemes for the hybrid plasma models with kinetic ions and massless electrons*

12:00 – 12:30 Yann Munschy (invited): *Kinetic plasma-wall interaction using immersed boundary conditions*

12:30 - 14:30 Lunch

Early Afternoon Session (Chair:Julia Stawarz)

14:30 – 15:00 Maria Federica Marcucci (invited): *Unveiling plasma energization and energy transport with multi-scale observations in the Earth's Magnetospheric System: the Plasma Observatory mission.*

15:00 – 15:15 Greg Hammett: *A positivity-preserving, energy-conserving, discontinuous Galerkin algorithm for hyperbolic conservation laws.*

15:15 – 15:30 Francesco Pucci: *Hybrid Vlasov simulations of solar wind interacting with a comet*

15:30 – 15:45 Michael Nastac: *Phase-space turbulence in electrostatic plasmas.*

15:45 - 16:15 Coffee break

Late Afternoon Session (chair: Julia Stawarz)

16:15 – 16:30 Stephen Majeski: *Self organization in high beta, collisionless turbulence*

16:30 – 16:45 Daniel Verscharen: *Statistical mechanics of the electrons in the solar wind: stability and instability of whistler waves*

16:45 – 17:00 Hongtao Liu: *An efficient energy conserving semi-Lagrangian scheme for plasma simulations*

17:00 – 17:15 Mahdi Mahjour: *Designing a mixed probe and a novel piezo drive amplifier to calibrate ball pen tips of the mixed probe in IR-T1 Tokamak*

17:15 – 17:30

Thursday, February 1, 2024

Early Morning Session (chair: Francesco Valentini)

09:15 – 10:00 **Keynote Lecture:** Katharina Kormann: *Relativistic electromagnetic particle-in-cell methods*

10:00 – 10:15 Gabriele Celebre: *Phase space dynamics of unmagnetized plasmas: collisionless and collisional regimes*

10:15 – 10:30 Nicolas Crouseilles: *Exponential integrators for Vlasov equations.*

10:30 – 11:00 Coffee break

Late Morning Session (chair: Francesco Valentini)

11:00 – 11:30 Martin Campos Pinto (invited): *Hamiltonian particle schemes for Vlasov-Maxwell equations*

11:30 – 11:45 Lucio Demeio: *Wigner function with correlation damping*

11:45 – 12:00 Maxence Antoine: *Embedded grid refinement for Semi-Lagrangian parallelized relativistic Vlasov-Maxwell solver*

12:00 – 12:30 Jimmy Juno (invited): *Novel parallel-kinetic perpendicular-moment model for magnetized plasmas*

13:00 - 14:20 Lunch

Closing