

# Princeton University ExB Workshop Agenda

## Princeton Plasma Physics Laboratory (PPPL) & Mechanical and Aerospace Engineering (MAE) Department

Thursday November 1, 2018

Location: Melvin B. Gottlieb Auditorium, PPPL

Time	Session Title	Speakers	Subject
8:30 am	<b>Welcome</b>	<b>PPPL Lab Director/Deputy for Research &amp; Workshop organizers</b>	<b>Introduction to workshop, logistic, and workshop goals (need for VV and examples from other fields on high level)</b>
8:45 am	<b>Invited Talk</b>	<b>J. Koo (AFRL)</b>	<b>Accelerated models development</b>
9:00 am	Validation & Verification for discharges and sheath	<b>Moderators: I. Kaganovich (PPPL), A. Bourdon (LPP, France)</b>	
		I. Kaganovich (PPPL)	Examples for Benchmarking and Validation for DC and RF discharges
		A. Tavant (LPP, France)	Verification, validation and benchmarking during the development of LPPic, a PIC simulation code for magnetized plasmas
		Discussions	
9:30 am	Mechanisms of ECDI saturation and turbulence	<b>Moderators: JP Boeuf (CNRS Toulouse), A. Smolyakov (Univ. Saskatchewan, Canada)</b>	
9:30 am	Mechanisms of ECDI saturation and turbulence Part I	J-P. Boeuf (CNRS Toulouse, France)	ExB drift instability, introduction, physics and benchmark definitions
		A. Smolyakov (Univ. Saskatchewan)	Theory and PIC simulation
		Discussions	
10:00 am	Break for coffee		
10:15 am	Mechanisms of ECDI saturation and turbulence Part II	F. Taccogna (CNR-Nanotec, Bari, Italy)	1D azimuthal, and 2D radial-azimuthal PIC simulations
		T. Charoy (LPP, France)	In LANDMARK : the 2D axial-azimuthal Particle-In-Cell benchmark on ExB discharges
		I. Katz (NASA JPL)	Electron transport in the acceleration of a Hall thruster
		S. Janhunnen (Univ. Saskatchewan)	Noise effects in PIC simulations relevant to the ECDI
		K. Hara (Texas A&M Univ.) and R. Martin (AFRL)	More on 1D azimuthal, and 2D radial-azimuthal PIC simulations
		Discussions	

11:15 am	<b>Tour of selected experiments at PPPL. Tour Guide: Jacob Simmonds (Princeton Univ./PPPL)</b>		
12:15 pm	<b>Lunch</b>		
1:00 pm	Kinetic vs Fluid, Hybrid For what phenomena we need each approach Computational cost vs rigorous calculations	<b>Moderators: A Smolyakov (Univ. Saskatchewan, Canada) and I. Mikellides (NASA JPL)</b>	
		I. Mikellides (NASA JPL) and A. Smolyakov (U Saskatchewan, Canada)	Introduction
		G Hagelaar (CNRS Toulouse, France)	Comparison of the results of fluid and hybrid/kinetic simulations: LANDMARK Test Case 3.
		A. Lopez Ortega (NASA-JPL)	Progress on fluid computations of Hall thrusters: first-principles model for anomalous transport and dynamics effects".
		B. Jorns (Univ. Michigan)	Machine-learning informed closure of fluid equations
		B. Cuenot (CERFACS, France)	The behavior of the electron cyclotron drift instability with a fluid code
		R. Martorelli (LPP, France)	Towards a self-consistent modeling of anomalous transport in fluid simulations of Hall Effect Thrusters
		Discussions	
2:15 pm	Low frequency phenomena in ExB discharges modeling and experiments	<b>Moderators: Y. Raitses (PPPL), M. Cappelli (Stanford Univ.) and G. Hagelaar (CNRS Toulouse, France)</b>	
		A. Smolyakov (Univ. Saskatchewan, Canada) and Y. Raitses (PPPL)	Control and suppression of low frequency oscillations in ExB discharges
		T. Powis (Princeton Univ.)	Frequency Scaling of the Rotating Spoke in a Penning Discharge
		M. Cappelli (Stanford Univ.)	Voltage-dependent behavior of coherent drift modes and turbulent transition regimes in small magnetron devices
		K. Hara (Texas A&M Univ.)	Numerical simulations of breathing mode and azimuthally rotating spokes in Hall thrusters"
		D. Eremin (Ruhr-Universität Bochum, Germany)	PIC Simulations of Spokes in Magnetron Plasmas
		A. Escarguel (Aix-Marseille Université/CNRS, France)	Rotating spokes study in the Mistral experiment
		G. Fubiani (CNRS Toulouse, France)	2.5D PIC-MCC modelling of a magnetised plasma column
		E. Rodriguez (PPPL)	Boundary induced reduction of spoke-like activity
		Discussions	
4:15 pm	<b>Break</b>		

4:45 pm	Experiments in turbulence	<b>Moderators: S. Tsikata (CNRS-ICARE, France) and B. Jorns (Univ. Michigan)</b>	
		R. Boswell (ANU, Australia)	Three wave interactions in a magnetised plasma
		M. Cappelli (Stanford Univ.)	Probe-based studies of disturbances/turbulence in a Hall discharge
		B. Jorns (Univ. Michigan)	Probe-based measurements of High-Frequency Azimuthal Oscillations in a Magnetically Shielded Hall Thrusters
		V. Skoutnev (PPPL)	Phase Analysis of Sweeping Probe Data Using the Hilbert Transform
		Discussions	
6:00 pm	Adjourn		
7:00 pm	<b>Workshop Banquet at Prospect House (Faculty Club) on the main campus of Princeton University</b>		

Friday November 2, 2018

Location: The Convocation Room, Friend Center, 65 Olden St., Princeton University

Time	Session Title	Speakers	Subject
8:30 am	Other anomalous electron ExB transport (e.g. near-wall conductivity)	<b>Moderators: M. Keidar (George Washington Univ.) and E. Ahedo ( Universidad Carlos III de Madrid, Spain)</b>	
		E. Ahedo (Universidad Carlos III de Madrid, Spain)	Non-Maxwellian EVDF features in a Hall thruster chamber
		F. Taccogna (CNR-Nanotec, Bari, Italy)	Probabilistic Monte Carlo Module for secondary electron emission
		I. Kaganovitch and Y. Raitses, (PPPL)	Inverse-sheath
		M. Keidar (George Washington Univ.)	Periodic structures near wall controlled by magnetic field
		Discussions	
9:45 am	Break		
10:00 am	Towards full 3D modeling and GPU	<b>Moderators: F. Taccogna ( CNR-Nanotec, Bari, Italy) and J. Carlsson (PPPL)</b>	
		F. Taccogna ( CNR-Nanotec, Bari, Italy)	Three-dimensional PIC models of small HTs
		G. Fubiani (CNRS, Toulouse , France)	Modeling in 3D the effect of the channel walls in HTs
		J. Carlsson (PPPL)	Large-scale PIC-MCC simulation of low-temperature plasmas
		D. Eremin ( Ruhr-Universität Bochum, Germany)	3D PIC magnetron simulations on GPU
		Discussion	
11:00 am	<b>Invited talk</b>	<b>N. J. Fisch (Princeton University)</b>	<b>ExB rotating plasmas effects</b>
11:30 am	ExB Mass—filtering	<b>Moderators: R. Gueroult (CNRS Toulouse, France)</b>	
		R. Gueroult (CNRC, Toulouse, France)	ExB configurations for separation applications
		A. Fruchtman (HIT, Israel)	Particle trajectories in ExB configurations
		Discussions	
12:00 pm	Lunch served in the Convocation Room		

<b>1:00 pm</b>	<b>EPPDyL Lab tour. Tour Guide: Edgar Choueiri, Pierre-Yves Taunay, Sebastian Rojas Mata (Princeton Univ.)</b>		
1:45 pm	Instabilities and Turbulence	<b>Moderator: E. Choueiri (Princeton Univ.)</b>	
		B. Jorns (Univ. Michigan)	A Review of plasma instabilities relevant to ExB plasmas.
		S. Rojas (EPPDyL, Princeton Univ.)	Modeling and Measurements of Micro-instability Dispersion Relations
		S. Tsikata (CNRS-ICARE, France)	Microturbulence in modified thruster architectures
		Discussions	
<b>3:15 pm</b>	<b>Break</b>		
3:00 pm	Unusual effects in magnetic nozzles	<b>Moderator: R. Boswell (Australian National Univ., Australia)</b>	
		E. Ahedo (Universidad Carlos III de Madrid, Spain)	Electron kinetics in a magnetic nozzle expansion
		A. Fruchtman (HIT, Israel)	Magnetic nozzles and plasma expansion
		C. Swanson (PPPL)	Observation of minority fast electron dynamics in a low-pressure RF discharge and magnetic nozzle.
		I. Kaganovich (PPPL)	Fast expansion of a plasma beam controlled by short-circuiting effects in a longitudinal magnetic field
		R. Boswell (ANU, Australia)	Experimental confirmation of the Ion Shepherd concept
		Discussions	
<b>5:00 pm</b>	<b>Workshop Adjourn</b>		