Simons Workshop on Singularities in Fluids and Plasmas  
Princeton Center for Theoretical Science, March 18-20, 2020

March 18
8:00-9:00 Registration and continental breakfast

SESSION I  Chair: A. Bhattacharjee
9:00-9:10 Welcome and logistics A. Bhattacharjee
9:10-9:50 Deformation and rigidity of equilibria P. Constantin
9:50-10:30 Non-conservation of the dimension for passive and active scalars J. Rodrigo
10:30-11:00 Coffee
11:00-11:40 On a sufficient condition for finite-time singularity in Kida-Pelz flow C.-S. Ng
11:40-12:10 Discussion of Session I talks
12:10-1:30 Lunch

SESSION II  Chair: P. Helander
1:30-2:10 Inverse problem for an equilibrium current sheet R. Dewar
2:10-2:50 Current singularity formation in line-tied magnetic fields Y. Zhou
2:50-3:20 Coffee
3:20-4:00 Lessons learned about the existence and accessibility of three-dimensional ideal MHD equilibria J. Loizu
4:00-4:40 Machine learning from a continuous viewpoint W. E
4:40-5:10 Discussion of Session II talks
6:30-9:00 Workshop Dinner: Nassau Inn

March 19
8:30-9:00 Continental breakfast

SESSION III  Chair: R. MacKay
9:00-9:40 Quasisymmetric solutions to forced MHD D. Ginsburg
9:40-10:20 An ideal magnetic evolution contains the seed of its own destruction A. Boozer
10:20-10:40 Coffee
10:40-11:20 Near-singular currents and flows near magnetic islands in magnetically confined plasmas A. Reiman
11:20-12:00 Elimination of MHD current sheets by modifications to the plasma wall in a fixed boundary model E. Kim
12:00-12:30 Discussion of Session III talks
12:30-1:30 Lunch
SESSION IV  Chair: P. Constantin

1:30-2:10  Singularities in high-Reynolds number turbulence  K. Sreenivasan
2:10-2:50  The power spectrum of passive scalar turbulence in the Batchelor regime  J. Bedrossian
2:50-3:20  Coffee
3:20-4:00  Uniqueness of Whitham’s highest cusped wave  A. Enciso
4:00-4:40  Lagrangian and Dirac constraints and geodesic flow for the ideal incompressible fluid and MHD  P. Morrison
4:40-5:10  Discussion on Session IV talks

March 20
8:30-9:00  Continental breakfast

SESSION V  Chair: R. Dewar

9:00-9:40  The Hasimoto-Madelung transform and skew-mean-curvature flow in Euler hydrodynamics (remote)  B. Khesin
9:40-10:20  Singular equilibria and meta-stability  S. Cowley
10:20-10:40  Coffee
10:40-11:20  Formation of current sheets in relativistic magnetospheres of black holes and neutron stars  S. Philippov
11:20-12:00  Near-singular dynamics of kinetic ballooning instabilities in plasmas  G. Dong
12:00-1:00  Lunch

Session VI Chair: A. Bhattacharjee

1:00-1:40  On the derivation of the wave-kinetic equation in weak turbulence  P. Germain
1:40-2:20  Singularities and phase-space dynamics in wave physics and turbulence  I. Dodin
2:20-3:00  Shock formation in compressible fluids  V. Vicol
3:00-3:30  Discussion and Adjournment