PLASMA ASTROPHYSICS

- Magnetohydrodynamic waves (Alfvèn, fast and slow magnetosonic waves).
- Method of characteristics in two dimensional problems (boundary conditions, explicit and implicit methods, steady supersonic flow, Riemann invariants).
- Steady magnetized flows with an ignorable coordinate (jets and angular momentum extraction from young stellar objects, Weber-Davis and Blandford-Payne models).
- Relativistic magnetohydrodynamics, applications to gamma-ray bursts, and jets from active galactic nuclei.
- Flow instabilities (Rayleigh-Taylor, Kelvin-Helmholtz, rotational, thermal, gravitational).
- Plasma instabilities (pinch, kink, Parker, magnetorotational).
- Magnetohydrodynamic shock waves.
- Magnetic reconnection.
- Magnetic Dynamo.
- Ambipolar diffusion.
- Kinetic theory for collisionless plasma, particle trajectories, adiabatic invariants.
- Plasma oscillations and Landau damping.