Mykola Gordovskyy: Numerical simulations of solar flares

Magnetic field   **Current**
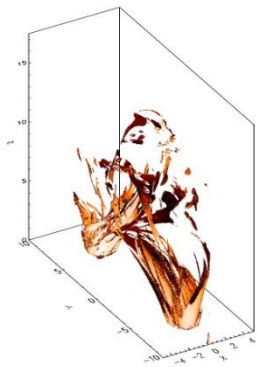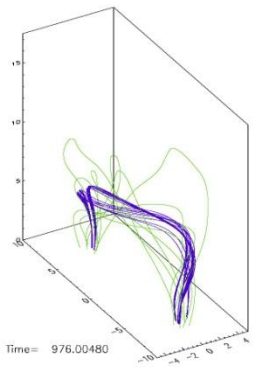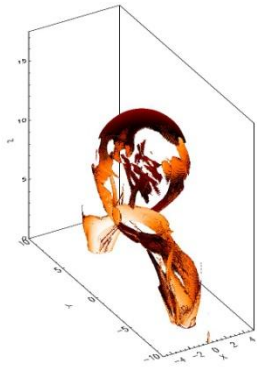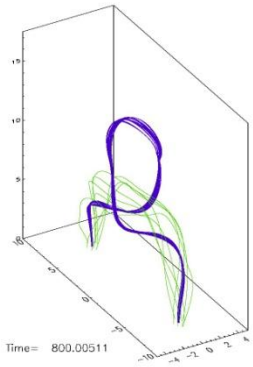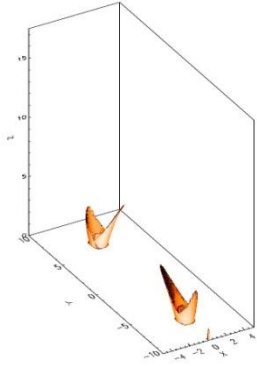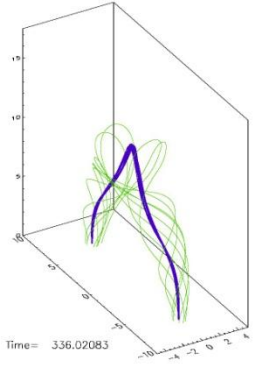

- Key questions:

   - what is the **source of solar flare energy**? How this energy is **accumulated and released**?

   - **how electrons and ions are accelerated in solar flares** to ~100MeV energies? how they precipitate towards the dense chromosphere? How they are transported in the interplanetary space?

- Key "ideological" element: **consistent treatment of different spatial scales** from 10^7m (size of coronal features) down to 1m (particle Larmor radii)

- Methods used: **MHD, Fokker-Planck/Vlasov, Particle-In-Cell**

- Observational features are predicted based on numerical models and compared with **RHESSI** data. Potentially **ALMA**, **LOFAR** and other can be used.

- Models can be applied to the magnetic reconnection and particle acceleration in the **Earth & planet magnetospheres** and other astrophysical phenomena, and **to laboratory plasmas**
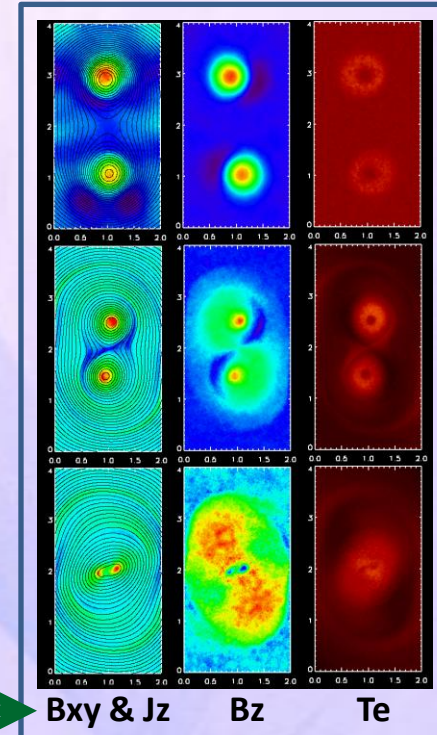
MHD model of solar flare occurring in the twisted coronal loop

2D PIC model of magnetic reconnection in Tokamak-like configuration ➡ **Bxy & Jz**   **Bz**   **Te**