

FALL 2018 SEMINAR SERIES

Computational models of magnetized outflows from young stellar objects, planetary nebulae and active galactic nuclei, and connections with laboratory experiments.

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WHEN: November 6 2018 2:30 PM - 3:30 PM

WHERE: MREB ROOM 200

Multi-disciplinary Research and Engineering Building BLD#484

ABSTRACT

I will talk about 3D magneto-hydrodynamic (MHD) models to study the formation, dynamics and polarized emission of stellar and galactic outflows. I will start with Magnetic towers; one of two fundamental forms of MHD outflows, less well studied than magneto-centrifugally launched outflows. 1000+ core simulations as well as data visualization provide detailed insights into the underlying physics of magnetic towers and help us constrain models of their propagation. I will then demonstrate the connection of our models with laboratory experimental studies, and the results relevance to astrophysical observations of young star jets and outflow from highly evolved solar type stars. This is very exciting as it connects the physics of astrophysical objects with laboratory plasmas and our model data. I will then talk about post-processing models of magnetic fields polarized emission and rotation measure, both in the context of the magnetic towers and some other models of radio galaxies. These emission models are very topical in the advent of the new generation of telescopes, such as ALMA, LOFAR and the SKA.

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BIO:

Born in Mexico City, studied Physics and got a MSc. in Theoretical Astrophysics at UNAM. Won a prestigious scholarship to do a Ph.D. at the Cavendish Laboratory in Cambridge University, UK, on high performance computing (HPC) models of relativistic outflows from radio galaxies. Then did a postdoc at the Computational Astrophysics group of University of Rochester, Rochester NY, and co-developed the multi-physics, parallel, scalable, adaptive-mesh-refinement code AstroBear, and was also Senior Scientist/Application Developer at the Institute of Optics. Martin joined UH-CACDS on July 2014. He does HPC methods research consulting and training, also leads the visualization of scientific data efforts, and does research on HPC algorithms, models of high energy astrophysics and connections with high energy density plasma laboratory experiments.