



Contribution ID: 153

Type: **Presentation**

Hybrid simulations of cosmic ray acceleration at shocks

Monday, June 23, 2014 2:55 PM (25 minutes)

Hybrid particle in cell simulations (with kinetic protons and fluid electrons) are providing us with unprecedented insights into the microphysics of collisionless shocks, also attesting to their ability to accelerate particles and to generate magnetic fields.

I present state-of-the-art 2D and 3D simulations of non-relativistic shocks, discussing under which conditions (shock strength and inclination) ions are injected and energized via diffusive shock acceleration. I also show how resonant and non-resonant instabilities generate magnetic turbulence, illustrating the energy spectrum of the self-generated turbulence.

Finally, I outline the relevance of these findings for cosmic ray acceleration at supernova shocks, also discussing the observational counterparts of the presented theory in selected remnants.

Primary author: CAPRIOLI, Damiano (Princeton University)

Presenter: CAPRIOLI, Damiano (Princeton University)

Session Classification: Cosmic Rays

Track Classification: Cosmic Rays