

Space Science Seminar
Tuesday, 2017 November 21
10:30 a.m.
NSSTC/2096

3D Modeling of Pulsar Bow-Shock Nebulae

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Host: Dr. Nick Pogorelov
(Sponsored by CSPAR)

Pulsars - rotating neutron stars - produce relativistic magnetized winds, somewhat reminiscent of the Solar wind. Fast moving pulsars interacting with the ISM produce bow-shock nebulae which are observed in radio, optical (H-alpha), and X-rays. I will discuss first 3D relativistic MHD simulations of the wind-ISM interaction. Magnetic stresses modify considerably the morphology of the shocked wind flow. The appearance of the nebulae depends on the relative orientation of the velocity, pulsar spin axis, and the line of sight. We are able to reproduce many subtle morphological features. I will also discuss surprising jet-like features seen in some cases - they are produced by the wind particles that escaped the nebula through localized reconnection spots.

<https://solarscience.msfc.nasa.gov/colloquia/>