BOSTON UNIVERSITY

Boston University College of Arts & Sciences
Institute for Astrophysical Research

2022—2023 ASTROPHYSICS SEMINAR SERIES

How do stars shape interstellar gas?

cosmic rays -- supernova -- UV radiation

Stars form in interstellar clouds through gravitational collapse. To remain gravitationally unstable, the clouds need to efficiently lose energy, which they do through radiative cooling. Once the stars form, they begin injecting energy back into the interstellar medium, which regulates the next-generation star-formation process. In this talk, I will review key aspects of this feedback process, focusing on the interaction of supernovae, cosmic rays, and far-UV radiation with interstellar clouds.

I will discuss our recent discovery of the "Per-Tau Shell", a gigantic 3D shell of gas and dust in the solar vicinity, that is actively forming new stars. This provides the first 3D observational evidence for the constructive aspect of supernovae, where instead of destroying clouds, supernovae promote cloud condensation and trigger the formation of a new generation of stars. Supernovae are also the dominant sites of acceleration of cosmic rays. I will discuss a new way of constraining the cosmic-ray interstellar spectrum at low energies (E<GeV), which is currently highly uncertain. The James Webb Space Telescope will be a key player in this quest, shedding new light on the generation and propagation of low-energy cosmic rays.

Monday, October 17th

3:30 - 4:30 p.m.

725 Commonwealth Ave | Room 502

Shmuel Bialy

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