



College of Arts & Sciences

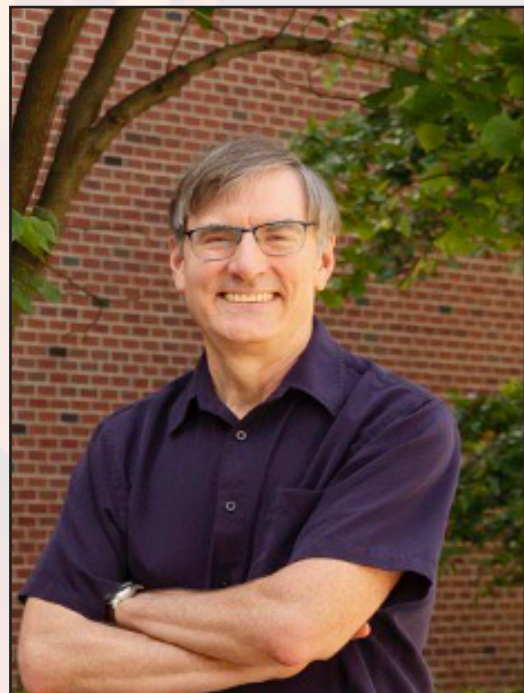
Institute for Astrophysical Research

Astrophysics Fall Seminar Series

When Stars Attack! Unveiling Nearby Cosmic Explosions with Live Radioactivity on the Earth and Moon

Recent nearby stellar explosions can deliver their ejecta to the solar system and into the heliosphere. Some debris can reach the Earth and Moon, leaving a telltale signature in the form of live (not decayed) radioisotopes in the geological record. Remarkably, there is now a wealth of evidence that this has occurred: live ^{60}Fe is found globally and in lunar regolith samples, and recently ^{244}Pu is also detected. These point to recent supernova activity but also to a source of the r-process that produces the heaviest elements.

We will discuss the astrophysical implications of these detections, including (a) the mechanisms needed to deliver explosion debris to the Earth, (b) the progenitor scenarios that can account for the data, and (c) the tests that could distinguish among the possibilities while offering a new probe of r-process nucleosynthesis. The larger lesson is that these recently-arrived radioisotopes represent a new kind of cosmic messenger, and that fully understanding their story requires that we weave together not only a wealth of astrophysics, but also heliophysics, nuclear physics, geology, and astrobiology.



Brian Fields

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Monday, October 5th
2:30 - 3:30 PM
CAS 502