



## ASTROPHYSICS SEMINAR SERIES

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Tuesday, February 18 12:30 pm - Rm 184 NSH

# When Stars Attack! Near-Earth Supernova Explosions Revealed by Deep-Ocean and Lunar Radioactivity

Supernovae are central actors in galaxy evolution, multimessenger particle engines, and create many of the elements essential for planets and life. Yet these awesome events take a sinister shade when they occur close to home, because an explosion very nearby would pose a grave threat to Earthlings. We will show how radionuclides produced by supernovae can reveal nearby events in the geologic past, and we will highlight isotopes of interest. In particular, geological evidence for live  $^{60}\text{Fe}$  has recently been confirmed globally in multiple sites of deep-ocean material, in cosmic rays, and in lunar samples. We will review astrophysical  $^{60}\text{Fe}$  production sites and show that the data demand that at least one core-collapse supernova exploded near the Earth over the past few Myr, and explain how debris from the explosion was transported to the Earth as a “radioactive rain.” Deep-ocean and lunar  $^{60}\text{Fe}$  measurements thus represent a laboratory for supernova astrophysics, but also with implications for geology, astrobiology, and possibly terrestrial evolutionary biology.



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