

PHYSICS DEPARTMENT COLLOQUIUM

“When Stars Attack! Live Radioactivities as Signatures of Nearby Supernova Explosions”

BY

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The lifespans of the most massive stars are a symphony of the fundamental forces, culminating in a spectacular and violent supernova explosion. While these events are awesome to observe, they can take a more sinister shade when they occur closer to home, because an explosion inside a certain "minimum safe distance" would pose a grave threat to life on Earth. We will discuss these cosmic insults to life, and ways to determine whether a supernova occurred nearby over the course of the Earth's existence. We will then present recent evidence that a star exploded near the Earth about 3 million years ago. Radioactive iron-60 atoms have been found in ancient samples of deep-ocean material, and are likely to be debris from this explosion. Recent data confirm this radioactive signal, and for the first time allow sea sediments to be used as a telescope, probing the nuclear reactions that power exploding stars. Furthermore, an explosion so close to Earth was probably a "near-miss," which emitted intense and possibly harmful radiation. The resulting environmental damage may even have led to extinction of species which were the most vulnerable to this radiation.

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4:00 PM IN 102 JFB
REFRESHMENTS AT 3:30 PM IN 219 JFB