

Department of Mathematics and Statistics & Department of Physics and Engineering Physics

Colloquium Announcement

Friday
November 25 2016

Physics Building
Room 103 @ 3:30 PM

Using Lead to Learn About Supernovae

Guest Speaker:

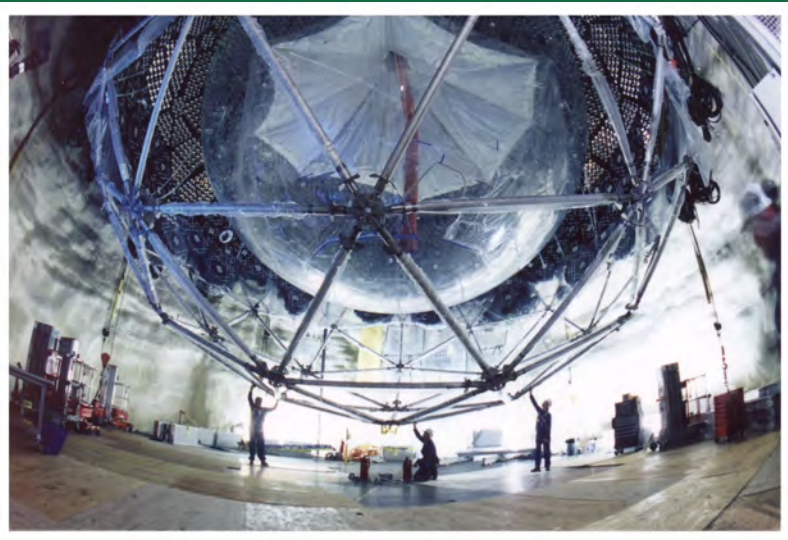
Dr. Clarence J. Virtue

Laurentian University / SNOLAB



Abstract:

As a massive star evolves, near the end of its life the mass of its iron core reaches 1.4 solar masses. At this point, the Chandrasekhar limit, quantum mechanical forces can no longer resist the gravitational force and a chain of events results in the collapse of the iron core to a neutron star. This occurs over the brief time interval of about 10 ms and is the trigger for a colossal explosion, a Type II Supernova. In the collapse of the core the radius, containing 1.4 solar masses of matter, decreases by a factor of 25,000, converting enormous gravitational potential



energy to heat, resident in the neutron star. Over 99% of this heat escapes the neutron star in some 10's of seconds in the form of neutrinos. Just as neutrinos allowed us to peer into the core of the Sun, they are also our only window into the heart of a supernova. Several supernova sensitive neutrino detectors currently operate worldwide. My talk will focus on

HALO and HALO-1kT, an existing and a future lead-based supernova detector, and the unique contributions that they can make to the physics extracted from the next galactic supernova.