Physic Department
The University of Texas at Arlington

COLLOQUIUM

Reconstructing Halloween Special: Developing High Intensity Ion Beams to Hunt Ghost particles

Dr. Daniel Winklehner
MIT

Wednesday October 31, 2018
4:00 p.m. Room 100 Science Hall

Abstract

In the field of the physics of particle beams we are constantly pushing the frontiers of highest energy, highest intensity, and best quality beams. These are strongly correlated parameters and often increasing one comes at the expense of reducing the others. However, through innovation and by leveraging physics (e.g. collective effects) we continuously reduce these tradeoffs. Recently, we have developed a very compact and cost-effective cyclotron-based driver to produce very high intensity beams. The system will be able to deliver continuous wave (cw) electrical beam currents of >10 mA of protons on target in the energy regime around 60 MeV. This is a factor 4 higher than the current state-of-the-art for cyclotrons. All areas of physics and energy science that call for high cw currents can greatly benefit from this result. In this colloquium, I will mainly focus on one example use of this accelerator for producing flavor-pure neutrino beams for IsoDAR (the Isotope Decay-At-Rest experiment), a proposed search for sterile neutrinos. I will present the beam physics challenges that we have addressed to bring us to the present state and outline the next steps that will boost the energy to 1 GeV and enable multi-megawatt cyclotrons for neutrino physics and Accelerator Driven Systems (ADS).

Refreshments will be served at 3:30 in physics lounge