

# Physics Colloquium

Prof. Thomas Cocolios

## “The ISOLDE facility at CERN: A Radioactive Ion Beam Facility with a Broad Research Program”

The Isotope Separator OnLine DEvice (ISOLDE) is CERN's oldest still-running experiment with over 50 years of experience in the production of radioactive beams. As a fixed-target facility, it uses the 1.4 GeV proton beam from CERN's PS-Booster to irradiate a variety of thick targets to produce as many different radioisotopes as possible. Those nuclear recoils diffuse out of the target kept at high temperature (2300K), are ionized, accelerated up to 60 keV and mass separated through a dipole magnet to deliver a pure beam to experiments in a few ms. In this way, ISOLDE has delivered >1,000 different isotopes of 71 different elements for a broad research program. The original - and still current - research activity at ISOLDE is the study of nuclear properties to further our understanding of the forces at play in the atomic nucleus. This includes the study of nuclear ground-state properties such as binding energies from high-resolution mass measurements, nuclear spin and electromagnetic moments from hyperfine interaction studies, or decay properties (half-life, decay modes, decay energies, ...). Even more than a century since Marie Curie and Ernest Rutherford, we are still puzzled by what the atomic nucleus has to reveal! In this colloquium, I shall introduce the ISOLDE facility at CERN, its working principle, and some recent research highlights in nuclear structure, nuclear astrophysics and its broader program.

*Dr Thomas Elias Cocolios, Associate Professor at the KU Leuven Institute of Nuclear & Radiation Physics (Belgium). Thomas is an American/French national and studied Math & Physics at McGill University in Montréal, Quebec. He obtained his MSc from McGill University in 2005 from research with radioactive beams at TRIUMF in Vancouver, British Columbia, and his PhD from KU Leuven in 2010 for nuclear physics research performed at CRC in Louvain-La-Neuve (Belgium) and CERN ISOLDE. He was a CERN Research Fellow at ISOLDE from 2010 until 2012 and then an STFC Ernest Rutherford Fellow at The University of Manchester until 2015. His work concentrates on the study of ground-state properties of radioactive nuclei to challenge nuclear structure models. He joined KU Leuven again as an Assistant Professor in 2015, where he developed a new research line for the production of novel medical radioisotopes in parallel to his fundamental research program and represents Belgium on the CERN MEDICIS Collaboration Board. He obtained his tenure in 2020 and is often seen knitting in meetings.*

**Thursday February 4th at 4:25 via Zoom**

**If you are outside the Lehigh Physics Department, please email Marina Long (mal516@lehigh.edu) for a link.**