

Talk Title: Laser spectroscopy - present and future at ISOLDE

Abstract

Laser spectroscopy experiments at the ISOLDE facility already have a venerable history now spanning more than 30 years. This period has seen the development of a remarkable variety of laser techniques in order to study rare isotopes far from stability, which include in-source, collinear and β -NMR/ β -NQR laser spectroscopy to name but a few. These innovative ideas reflect the demands placed on laser spectroscopy by not only the element under study, but also the mechanism by which it is produced. The propensity for innovation in laser spectroscopy at ISOLDE has continued in the last two years, helped in part by synergies with laboratories across Europe. This has been crucial for the successful application of bunched-beam spectroscopy being successfully applied to study the Cu and Ga isotope chains. The introduction of the frequency comb has allowed absolute frequency measurements to be made on the Be isotope chain, permitting the charge radii to be determined for the one-neutron halo nucleus, ^{11}Be . New ionization schemes have been developed for the Po atom, which allowed in-source spectroscopy to be performed down to ^{191}Po , which was detected with a rate of approximately 0.1 atoms/second.

The future HIE-ISOLDE facility will provide experimentalists with improved ion-beam quality, increased yields and a larger number of accessible elements. Several new experiments are now in preparation to maximise the reach of laser spectroscopy at HIE-ISOLDE, which include collinear resonance ionization spectroscopy, in-cooler optical pumping and ion-resonance ionization spectroscopy. This talk will present a review of the recent laser spectroscopy experiments at ISOLDE and the future prospects at the HIE-ISOLDE facility.