Contribution ID: **50** Type: **poster**

Progress towards the Single Atom Microscope: measuring rare-reaction rates for nuclear astrophysics

Wednesday, 23 May 2018 16:30 (1h 30m)

We propose a new method for measuring the rate of rare nuclear reactions by capturing the heavier atomic products in a noble gas solid.
Once embedded in the transparent noble gas matrix, the products are selectively identified via laser fluorescence spectroscopy
and individually counted via optical imaging to determine the reaction rate. Single atom sensitivity is feasible due to the noble
gas matrix facilitating a Stokes shift between the emission and excitation spectrum of the product atoms, granting the possibility
to carefully filter out the excitation light. The combination of a recoil separator, for isotopic selectivity and beam heat load
reduction, and the tools and techniques borrowed from the fields of single molecule spectroscopy and super-resolution imaging
allows for a detecting scheme with near unity efficiency, a high degree of selectivity, and single atom sensitivity. This technique
could be used to measure a number of astrophysically relevant reaction rates.

Primary author: LOSETH, Benjamin (NSCL, Michigan State University)

Co-author: Prof. SINGH, Jaideep (NSCL/MSU)

Presenter: LOSETH, Benjamin (NSCL, Michigan State University)

Session Classification: Poster Session