# Intense short pulse (n,x) reaction studies on stable and radionuclei using ATHENA at NIF

M.Febbraro,[1] R.P.Rera,[1] C.Yeamans,[2] J.W.McClory,[1] D.A.Buchanan,[1]
W.T.Dailey,[1] J.J.Manfredi,[1] D.E.Holland,[1] H.Y.Lee,[3] and S.A.Kuvin[3]

[1] *Air Force Institute of Technology, Department of Engineering Physics, WPAFB, OH, USA*

[2] *Lawrence Livermore National Laboratory,*
*National Ignition Facility, Livermore, CA, USA*

[3] *Los Alamos National Laboratory, Low Energy Nuclear Physics, Los Alamos, NM, USA*

Understanding the production of radionuclei produced by intense short neutron pulse environments is important for nuclear science applications. In a short pulse high instantaneous neutron flux environment, these radionuclei are produced through an often-complex network of completing reaction channels which may occur not only on ground states but also excited states. Reconstruction of neutron energy spectra from fluence monitors or predicting fallout debris, for example, require knowledge of these reaction networks to properly determine the neutron environment. The ATHENA experimental platform at NIF provides a unique capability for investigating these reaction networks through integral measurements under controlled laboratory conditions. At the heart of the ATHENA platform is an energy tuning assembly which modifies the DT thermonuclear NIF spectrum into a desired spectral shape. This results in a tunable neutron energy spectrum rather than monoenergetic neutrons from DT fusion. In this talk, an overview of the experimental capabilities of the ATHENA platform will be discussed as well as recent results from a NIF ATHENA shot on iridium will be presented.