Illinois Wesleyan University
Digital Commons @ IWU

John Wesley Powell Student Research Conference 2009, 20th Annual JWP Conference

Apr 18th, 11:00 AM - 12:00 PM

Observation of a Low-Lying Neutron Unbound State in 25F

Alison Smith, '10
Illinois Wesleyan University

Nathan Frank, Faculty Advisor
Illinois Wesleyan University

Follow this and additional works at: https://digitalcommons.iwu.edu/jwprc

https://digitalcommons.iwu.edu/jwprc/2009/oralpres7/2

This is protected by copyright and/or related rights. It has been brought to you by Digital Commons @ IWU with permission from the rights-holder(s). You are free to use this material in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/or on the work itself. This material has been accepted for inclusion by faculty at Illinois Wesleyan University. For more information, please contact digitalcommons@iwu.edu.
©Copyright is owned by the author of this document.
OBSERVATION OF A LOW-LYING NEUTRON UNBOUND STATE IN $^{25}$F

Alison Smith and Nathan Frank*
Physics Department, Illinois Wesleyan University

A neutron unbound state from $^{25}$F has been observed for the first time. Prior experimental data on neutron-rich fluorine isotopes indicate differences for bound excited states as compared to nuclear shell model predictions. The $^{25}$F isotopes were produced by one-proton removal from an 86 MeV/u $^{26}$Ne beam on a Beryllium target at the fast-fragmentation radioactive beam facility of the National Superconducting Cyclotron Laboratory at Michigan State University. The subsequent decay of the $^{25}$F isotopes resulted in $^{24}$F and neutrons which were detected in coincidence. The charged particles were bent away from the neutrons with a superconducting magnet and analyzed in a suite of charged particle detectors. The neutrons were detected in the Modular Neutron Array (MoNA). The properties of the charged particles and neutrons were used to reconstruct a decay energy spectrum for $^{25}$F which was compared to simulations. Preliminary results indicating a resonant state at approximately 30 keV will be discussed.

Work supported by National Science Foundation Grants PHY-0606007 and PHY-055445