University of Notre Dame
College of Science
Department of Physics

# NUCLEAR SEMINAR

## Nucleosynthesis in AGB stars: $^{19}$F production


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## Monday, November 8, 2010 4:00 p.m. NSH 124
**(Refreshments will be served prior to the seminar in 124 NSH)**


The origin of fluorine is a longstanding problem in nuclear astrophysics. There are three promising astrophysical sites where $^{19}$F, the only stable fluorine isotope, can be synthesized: Core Collapse Supernovae, Wolf Rayet stars, and AGB (Asymptotic Giant Branch) stars. Recent works seem to indicate that AGB stars are the principal producers of the Galactic fluorine. Detailed modeling of AGB star nucleosynthesis is therefore mandatory to confirm this claim. Fundamental ingredients for these models (still affected by many uncertainties) are nuclear reaction rates, whose values strongly influence the associated chemical evolution. The aim of the present project is to improve the experimental knowledge of the rates of the most critical reactions affecting the fluorine production. A global analysis of all uncertainties will be performed to reproduce the spectroscopic abundances observed for different stellar populations. This effort will provide a reliable estimate of the Fluorine production in AGB stars and its contribution to the Galactic fluorine abundance. We propose to study $^{15}$N($\alpha$,$\gamma$)$^{19}$F and $^{17}$O(p,$\gamma$)$^{18}$F. Moreover we plan to start a feasibility study for the $^{15}$N(p,$\alpha$)$^{12}$C, and $^{18}$O(p,$\alpha$)$^{15}$N reactions, that represent the main production and destruction ways of $^{15}$N.


**ALL INTERESTED PERSONS ARE CORDIALLY INVITED TO ATTEND**