

# NUCLEAR SEMINAR SERIES

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**Monday, August 26**

**4:00 pm - Rm 184 NSH**

## ***Study of nuclear physics input-parameters for the nucleosynthesis of heavy elements***

Nuclear reaction cross sections are one of the main ingredients for the understanding of nucleosynthesis processes in stellar environments. For isotopes heavier than those in the iron-peak region, reaction rates are often calculated using the Hauser-Feshbach statistical model. The accuracy of the predicted cross sections strongly depends on the uncertainties of the nuclear-physics input-parameters as  $\gamma$ -ray strength functions ( $\gamma$ SF), nuclear level densities (NLD), and particle+nucleus optical model potential (OMP).

The direct measurement of  $(p,\gamma)$  and  $(\alpha,\gamma)$  reaction cross sections on heavier isotopes does not only provide direct input for the nucleosynthesis networks of the  $p$  isotopes but can also be used for systematic studies of the global low-energy OMPs.

Moreover, the measurement of primary  $\gamma$ -ray transition intensities in radiative capture reactions via high-resolution  $\gamma$ -ray spectroscopy provides detailed insights into the statistical  $\gamma$ -decay behavior and, thus, on the  $\gamma$ SF.

The first part of this talk will present recent measurements of  $\alpha$ -capture reactions on the  $p$  isotopes  $^{144}\text{Sm}$  and  $^{98}\text{Ru}$  for the investigation of the  $\alpha$ -OMP. The second part will introduce a method to study the  $\gamma$ SF using  $\gamma\gamma$ -coincidences and two step  $\gamma$ -ray cascades in  $(p,\gamma\gamma)$  reactions at different excitation energies and show recent results on the  $\gamma$ SF in  $^{64,66}\text{Zn}$ .

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