CONSTRAINING (N,G) REACTION CROSS SECTIONS FOR ASTROPHYSICAL APPLICATIONS

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The rapid neutron capture process (r-process) is responsible for the synthesis of approximately half of the isotopes of the heavy elements. Despite this important role in stellar nucleosynthesis, many open questions remain, with the main one being the unknown site of the r-process. The astrophysical calculations that aim at reproducing the observed r-process abundance distribution suffer from the significant nuclear physics input uncertainties. Masses, β-decay half-lives, β-delayed neutron emission probabilities and neutron capture reaction rates are the main nuclear properties needed in r-process calculations. Out of these quantities, the neutron capture rates are by far the most uncertain due to the complete lack of experimental data along (or even close to) the r-process path. This talk will present a new experimental technique to extract neutron capture cross sections on short-live nuclei. The technique is called the "β-Oslo" technique and relies on the use of β-decay to populate the compound nucleus of interest and extract its nuclear level density and γ-ray strength function. These experimental quantities are then used as input in statistical model calculations to extract the (n,γ) reaction cross section.