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Study of nuclear physics input-parameters via high-resolution γ-ray spectroscopy

Friday, 23 June 2017 11:40 (20 minutes)

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\long\def\TITLE#1{{\Large{\bf#1}}}\long\def\AUTHORS#1{ #1\\[3mm]}
\long\def\AFFILIATION#1#2{[1]  #2\\}
\begin{document}
{\small \it Nuclear Physics in Astrophysics 8, NPA8: 18-23 June 2017, Catania, Italy}

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\begin{center}
%%%
%%% Title goes here.
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\TITLE{Study of nuclear physics input-parameters via high-resolution $\gamma$-ray spectroscopy}\\[3mm]
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%%% Authors and affiliations are next. The presenter should be
%%% underlined as shown below.
%%%
\AUTHORS{P. Scholz[1], F. Heim[1], J. Mayer[1], M. Spieker, and A. Zilges[1] }

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{\small \it
\AFFILIATION{1}{Institute for Nuclear Physics, University of Cologne}
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% Enter contact e-mail address here.

\centerline{Contact email: {\it pscholz@ikp.uni-koeln.de}}

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%%% Abstract proper starts here.
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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 depend on the uncertainties of the nuclear-physics input-parameters. These are nuclear-level densities, γ-strength functions, and particle+nucleus optical-model potentials.

The precise measurement of total and partial reaction cross sections at sub-Coulomb energies and their comparison to statistical model calculations are used to constrain or exclude different nuclear-physics models.

This talk is going to introduce experimental methods and present recent experiments performed at the Cologne 10 MV FN-Tandem accelerator and the high-efficiency HORUS γ-ray spectrometer. Results for cross-section measurements of α induced reactions on the p nucleus ^{108}Cd [1] and the ^{85}Rb(p,γ) reaction will be presented. In addition, preliminary results of γ-strength function studies applying the method of two-step cascades [2] for the reactions ^{92}Mo(p,$\gamma\gamma$) and ^{63}Cu(p,$\gamma\gamma$) will be shown.\newline

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[1] P. Scholz \textit{et al.}, Phys. Lett. B \textbf{761} (2016) 247.
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\noindent
[2] F. Be\u{c}v\'{a}\u{r} \textit{et al.}, Phys. Rev. C \textbf{46} (1992) 1276.

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%%% End of abstract.
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