

Measurement of beta-decay properties of very neutron rich Pm isotopes for r-process studies

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The rapid neutron capture (so-called r-) process produces about half the heavy elements beyond the iron peak. The abundance distribution of the r-process is dominated by two large maxima at masses of $A \approx 130$ and $A \approx 195$ which form during the $(n,\gamma) \leftrightarrow (\gamma,n)$ equilibrium, but the rare-earth abundance peak (REP) around $A \approx 160$ originates from freeze-out during the late phases after neutron exhaustion. This provides a unique probe of the astrophysical conditions in the latter stages of the r-process [1].

To understand the production of the REP, the beta-decay properties of the involved isotopes have to be known. According to sensitivity studies the most influential nuclei to the REP formation can be found in the $A \approx 160$, $55 \leq Z \leq 64$ neutron rich region [2]. For this reason, an experiment at RIKEN Nishina Center have been carried out to measure the beta-decay parameters of Ce-Gd chains with the BRIKEN-AIDA array [4]. Details on the experiment as well as the first results for Pm isotopes will be presented.

[1] M. R. Mumpower *et al.*, ApJ. **752**, 117 (2012).

[2] M. R. Mumpower *et al.*, Prog. Part. Nucl. Phys. **86**, 86 (2016).

[3] M. R. Mumpower and G. C. McLaughlin, PRC **85**, 045801 (2012)

[4] A. Tolosa-Delgado *et al.*, Nucl. Instr. Meth. **925**, 133 (2019).