

Constraining the nu-p process via directly measured $^{56}\text{Ni}(n,p)$ cross section

For the increased interest on the impact of nu-p process in the search of an answer to the heavy element production puzzle in core-collapse supernovae, a direct (n,p) reaction measurement with the radioactive ^{56}Ni (a half-life of 6 days) was performed at Los Alamos Neutron Science Center (LANSCE). The radioactive ^{56}Ni was produced by irradiating protons on a ^{59}Co foil through the (p,4n) reaction at the Isotope Production Facility and the thin-deposited ^{56}Ni target was chemically separated, fabricated and characterized at the Hot Cell facility. Using the LENZ (Low Energy NZ) instrument, the first directly measured cross sections of $^{56,59}\text{Ni}(n,p)$, $^{56}\text{Co}(n,p)$, and $^{59}\text{Ni}(n,\alpha)$ will be reported. With the currently obtained experimental information, the reaction rate of $^{56}\text{Ni}(n,p)$ was updated and compared with other theoretical predictions. The final impact on the nu-p process will be discussed along with a plan of improving experimental uncertainty through optimized solenoidal spectrometer development at LANSCE.

Length of presentation requested

Oral presentation: 17 min + 3 min questions

Please select between one and three keywords related to your abstract

Nuclear physics - experimental

2nd keyword (optional)

Nuclear physics - theory

3rd keyword (optional)

Nucleosynthesis

Primary authors: GEORGIADOU, Anastasia (Los Alamos National Laboratory); DIGIOVINE, Brad (Los Alamos National Laboratory); LEE, Hye Young (Los Alamos National Laboratory); EIROA-LLEDO, Cecilia (Los Alamos National Laboratory); VERMELEN, Christian (Los Alamos National Laboratory); VOTAW, Daniel (Los Alamos National Laboratory); PERDIKAKIS, Georgios (Central Michigan University); HERMAN, Michal (Los Alamos National Laboratory); GASTIS, Panos (Los Alamos National Laboratory); TSINTARI, Pelagia (Central Michigan University); KUVIN, Sean (Los Alamos National Laboratory); MOSBY, Shea (Los Alamos National Laboratory); KAWANO, Toshihiko (Los Alamos National Laboratory); MOCKO, Veronika (Los Alamos National Laboratory)

Presenter: LEE, Hye Young (Los Alamos National Laboratory)