

Stellar $^{78,80,84,86}\text{Kr}(n, \gamma)$ Reactions Studied by Activation at SARAF-LiLiT, Atom Trap Trace Analysis and Decay Counting

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We report on (n, γ) neutron capture experiments performed with the Liquid-Lithium Target (LiLiT) and the mA-proton beam at 1.92 MeV (2-3 kW) from the Soreq Applied Research Accelerator Facility (SARAF) [1]. The setup yields high-intensity 30-keV quasi-Maxwellian neutrons ($3\text{-}5 \times 10^{10}$ n/s) closely reproducing the conditions of s -process stellar nucleosynthesis. The $^{78,80,84,86}\text{Kr}(n, \gamma)$ reactions at the border between weak- and strong- s process were studied. A Ti sphere filled with 100 mg of natural Kr gas was placed in an irradiation chamber downstream of LiLiT with a gold foil used as a neutron fluence monitor during the activation. The activities of the short-lived Kr isotopes ($^{79,85m,87}\text{Kr}$) were measured by γ decay counting with a HPGe detector. The long-lived Kr isotopes ($^{81,85g}\text{Kr}$) were measured by atom counting via Atom Trap Trace Analysis (ATTA) at Argonne and Low-Level Counting (LLC) at Bern. Preliminary results and their significance will be presented.

[1] M. Paul *et. al*, Eur. Phys. J. A **55**, 44 (2019)