The Study of the ^{6}Li(p,γ)^{7}Be Reaction at LUNA

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The ^{6}Li(p, γ)^{7}Be reaction is involved in several astrophysical scenarios such as the Big Bang Nucleosynthesis and ^{6}Li destruction in pre-main and in main sequence stars.

A recent direct measurement of the ^{6}Li(p, γ)^{7}Be cross section found a resonance-like structure at $E_{c.m.} = 195$ keV, corresponding to a $E_x \sim 5800$ keV excited state in ^{7}Be [1]. This result has not been confirmed neither by other direct measurements nor by theoretical calculations [2, 3]

In order to clarify the existence of this resonance a new experiment was performed at the Laboratory for Underground Nuclear Astrophysics (LUNA), located under 1400 m of dolomite rocks of Gran Sasso. Thanks to the extremely low background environment the ^{6}Li(p, γ)^{7}Be cross section can be measured down to low energies with unprecedented sensitivity.

The high intensity proton beam from the LUNA400kV accelerator was delivered to ^{6}Li evaporated targets of different composition and thickness. To detect the gamma rays from the ^{6}Li(p, γ)^{7}Be a HPGe detector was mounted in close geometry. In order to have a simultaneous detection of charged particles from the ^{6}Li(p, α)^{3}He channel a silicon detector was also used. Two independent Ion Beam Analysis techniques: Nuclear Reaction Analysis and Elastic Recoil Detection Analysis were performed at the Helmholtz Zentrum Dresden Rossendorf in Dresden to characterize the targets. The talk will provide a detailed description of the experimental setup. In addition preliminary results will be reported.

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[3] F.C. Barker, Aust. J. Phys. **33**, 159 (1980).