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Results of $^{20}\text{Ne}(p,\gamma)^{21}\text{Na}$ and status of $^{21}\text{Ne}(p,\gamma)^{22}\text{Na}$ reaction at Laboratory for Underground Nuclear Astrophysics (LUNA) experiment

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The Gran Sasso massif provides a natural shield against cosmic rays, allowing several precision measurements of nuclear reactions of astrophysical interest at the LUNA accelerator facility. In the last years several key reactions of NeNa cycle in AGB (Asymptotic Giant Branch) stars, novae and supernovae, have been studied. The

$^{20}\text{Ne}(p,\gamma)^{21}\text{Na}$ is the slowest reaction in the cycle and directly affects the abundances on Ne and Na isotopes. LUNA studied the $E_r = 386\text{ keV}$ resonance and the direct capture below $E_p = 370\text{ keV}$ using a gas target setup and two high purity germanium detectors. Same experimental setup has been recently used to study the $^{21}\text{Ne}(p,\gamma)^{22}\text{Na}$ reaction which have a significant role in the ^{22}Na radioactive isotope in novae and supernovae.

The experimental details, results on the $^{20}\text{Ne}(p,\gamma)^{21}\text{Na}$ and preliminary ones of the $^{21}\text{Ne}(p,\gamma)^{22}\text{Na}$ experimental campaign, together with Monte Carlo simulations, will be presented.

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