

ICHEP2012



Contribution ID: 360

Type: **Parallel Sessions**

## STUDY OF THE $2\text{H}(\alpha,\gamma)6\text{Li}$ REACTION PRODUCING $6\text{Li}$ IN STANDARD BIG BANG NUCLEOSYNTHESIS

*Saturday, July 7, 2012 4:30 PM (15 minutes)*

LUNA (Laboratory for Underground Nuclear Astrophysics) is devoted to measure nuclear cross sections relevant in astroparticle physics. The LUNA measurements are performed at the “Laboratori Nazionali del Gran Sasso” (LNGS), with the unique accelerator in the world operating underground. Here, the background induced by cosmic rays is orders of magnitude lower than outside. As a consequence, with the LUNA facility it is possible to make direct measurements at energies well below the coulomb barrier, thus giving a solid experimental footing on several field of astrophysics and particle physics, such as the solar neutrino flux, the stellar evolution and the primordial abundance of isotopes after BBN. The presentation is centered on the measurement of the  $2\text{H}(\alpha,\gamma)6\text{Li}$  reaction, that is the leading process to produce the primordial  $6\text{Li}$ . Recent observations of a high abundance of  $6\text{Li}$  in metal-poor stars (Asplund et al. 2006) are debated. However, because of the very low cross section, direct measurements exists only for energies greater than 700 keV, making the  $6\text{Li}$  abundance calculation affected by a large uncertainty.

For the first time, a direct measurement has been performed at energies around  $E_{\text{cm}}=100$  keV, i.e. well inside the BBN region of interest ( $40 \text{ keV} < E_{\text{cm}} < 300 \text{ keV}$ ). The innovative experimental technique and the preliminary results will be shown.

**Primary author:** Dr GUSTAVINO, Carlo (INFN (IT))

**Presenter:** Dr GUSTAVINO, Carlo (INFN (IT))

**Session Classification:** Room 216 - Particle Astrophysics and Cosmology -TR11

**Track Classification:** Track 11. Particle Astrophysics and Cosmology