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7Be(n,a) AND 7Be(n,p) CROSS-SECTION SECTION MEASUREMENT FOR THE COSMOLOGICAL LITHIUM PROBLEM AT THE n_TOF FACILITY AT CERN

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One of the most important unresolved problems in Nuclear Astrophysics is the so-called "Cosmological Lithium problem"(CLiP). It refers to the large discrepancy (factor 3-5) between the abundance of primordial 7Li predicted by the standard theory of Big Bang Nucleosynthesis (BBN) and the value inferred from the so-called "Spite plateau"in halo stars.
In the framework of Standard Model, a possible explanation for this longstanding puzzle is related to the incorrect estimation of the destruction rate of 7Be. Indeed in the standard theory of BBN, 95% of primordial 7Li is produced by the decay of 7Be (t1/2=53.2 days), relatively late after the Big Bang, when lower temperature of Universe allows electrons and nuclei to combine into atoms. Therefore, the abundance of 7Li is essentially determined by the production and destruction of 7Be.
While charged-particle induced reactions responsible for the destruction of 7Be have mostly been ruled out by recent measurements, data on the 7Be(n,a) and 7Be(n,p) reactions were so far scarce or completely missing, mainly due to experimental difficulties arising from 7Be specific activity.
Recently, both reaction cross-sections have been measured at n_TOF (CERN) taking advantage also of state-of-art techniques for the production of high-purity radioactive samples at ISOLDE, of high performance detection systems and, especially, of the innovative features of the new measuring station n_TOF-EAR2 particularly suited for challenging measurements on short-lived radioisotopes.
The two measurements provide for the first time nuclear data on 7Be(n,a) and 7Be(n,p) cross-section in a wide neutron energy range, namely in the energy range of interest for Nuclear Astrophysics.

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