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n + ^{7}Be cross-sections of astrophysical interest at the CERN n_TOF facility

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One of the most long-standing puzzles in nuclear astrophysics is the so-called "Cosmological Lithium Problem". The standard Big Bang nucleosynthesis theory (BBN) predicts the abundances of the light elements ^{2}H, ^{3}He, ^{4}He and ^{7}Li produced in the early universe. The primordial abundances of ^{2}H and ^{4}He inferred from experimental data are in good agreement with predictions. On the contrary, the theory overestimates the primordial ^{7}Li abundance by about a factor of three. In an attempt to solve this problem, a possible explanation was an incorrect estimation of the destruction rate from n + ^{7}Be reactions, being the decay of ^{7}Be responsible for the production of 95% of primordial Lithium. Data on the ^{7}Be(n, α) and ^{7}Be(n, p) reaction channels are scarce or inexistent, thus large uncertainty still affects the abundance of ^{7}Li predicted by BBN theory. With the aim of obtaining reliable data on the n + ^{7}Be reactions in a wide neutron energy range, two measurements have been performed at the n_TOF facility at CERN, taking advantage of the new high-flux experimental area (EAR2). New detectors have been specifically developed for these measurements, and new techniques employed for the production of high-purity ^{7}Be samples. In particular, for the first time a neutron measurement has been performed on a sample produced by implantation of a radioactive beam at ISOLDE. In this talk, the experimental apparatus and sample preparation techniques will be presented, together with recent results on the ^{7}Be(n, α) and ^{7}Be(n, p) reactions and their implications on the Cosmological Lithium Problem.

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