Neutron Capture Cross Section of ^{10}Be

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The pattern of the solar abundances of nuclides features a conspicuous minimum in the region of the light elements Li, Be, and B. The main origin of these scarce elements are thought to be spallations of C, N and O in the interstellar and circumstellar matter by cosmic gamma rays. It is referred to as interstellar nucleosynthesis. However, it is essential for the understanding of how the big bang nucleosynthesis and nuclear reactions in stars contributed to the observed abundances, to determine the involved capture reaction cross sections in this mass area. One of those, which has not been measured so far, is the ^{10}Be(n,γ) cross section.

The ^{10}BeO sample with 6.6 10^{19} ^{10}Be atoms has been produced at PSI. The sample was irradiated in a cyclic activation at the TRIGA reactor in Mainz. The characteristic γ-rays following the decay of ^{11}Be were measured using $LaBr_3$ scintillation detectors. The measurements were performed with and without cadmium wrapping to disentangle the thermal and epithermal components of the neutron flux.

An experiment to determine this cross section in the keV-regime is planned for this year at the Van de Graaff accelerator at the Goethe University Frankfurt. The ^{7}Li(p,n) reaction at 1912 keV provides a neutron spectrum corresponding to a stellar environment with $kT = 25$ keV.