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New measurement of the cross section of the Big Bang nucleosynthesis reaction D(a,g)6Li and its astrophysical impact

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The recent observations of non-negligible amounts of 6Li in old halo stars [1] have renewed interest in the Big-Bang Nucleosynthesis (BBN) of 6Li. The deduced primordial 6Li abundance was found to be unexpectedly large compared to the BBN predictions. One important ingredient in the BBN predictions is the low-energy D(a,g)6Li cross section. Up to now, the only available experimental result [2] for this cross section introduced an error of about a factor of 20 in the 6Li abundance at the energies of astrophysical interest (Ecm<300 keV). This uncertainty arises from the discrepancy between the theoretical low energy dependence of the S-factor and the experimental data. Accordingly, new measurements of the cross section of the D(a,g)6Li reaction using Coulomb dissociation (CD) of 6Li at 150 A MeV have been performed recently at GSI. The preliminary GSI results, which indicate a drop of the S-factor as predicted by theory [3] will be presented as well their impact on the calculated 6Li abundance as a function of the baryon-to-photon ratio eta.

[1] M. Asplund et al., astro-ph/0510636, Astrophys J. in press
[2] J. Kiener et al., Phys. Rev. C 44, 2195 (1991)
[3] A. Kharbach et al., Phys. Rev. C 58, 1066 (1998)

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