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Properties of the first $1/2^+$ state in ^{9}Be from electron scattering and astrophysical implications* — •Oleksiy Burda, Peter von Neumann-Cosel, and Achim Richter — Institut für Kernphysik, Technische Universität Darmstadt, Germany

The low-energy level structure of the ^{9}Be nucleus has long been a matter of interest, in particular with respect to the strength of three-body $\alpha + \alpha + n$ cluster configurations. This nucleus has the lowest neutron threshold ($S_n = 1.6654$ MeV) of all stable nuclei. Already the first excited $J^\pi = 1/2^+$ state lies at an excitation energy of several tens of keV above the ^{8}Be + n threshold. Parameters of this resonance are of great astrophysical importance since it is believed to provide an important route for the production of carbon and subsequently heavier nuclei triggering the r-process in core-collapse supernovae. Due to its closeness to the neutron threshold the resonance has a strongly asymmetric line shape but despite a large number of different experiments there still exist discrepancies between the various deduced resonance parameters [1]. We present high-resolution inelastic electron scattering experiments on ^{9}Be performed at the S-DALINAC. The resonance parameters of the first excited $1/2^+$ state in ^{9}Be are derived in a one-level R-matrix approximation from the present and older (e, e') data [2]. The astrophysically relevant $\alpha(\alpha n, \gamma)^9$Be reaction rate is extracted and discussed.

[1] F. C. Barker, Aust. J. Phys. 53 (2000) 247.
[2] G. Kuechler *et al.*, Z. Phys. A 326 (1987) 447.

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