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Measurements of pB11 Alphas in a Magnetically Confined Plasma

Abstract

Recent works re-evaluating the $p^{11}\text{B}$ fusion cross-section¹ and calculating the associated reactivity with both kinetic effects² and alpha channeling³ included have shown that the possible energy gain from a magnetically confined $p^{11}\text{B}$ fusion plasma is even larger than previously thought. TAE Technologies has developed the ideal high beta magnetic confinement device for burning $p^{11}\text{B}$ fuel, the beam-driven field reversed configuration, and, more recently, begun experiments with $p^{11}\text{B}$ fuel in partnership with Japan's National Institute for Fusion Studies on the superconducting stellarator, the Large Helical Device.⁴ In this talk, we will give an overview of TAE's approach to $p^{11}\text{B}$ fusion and describe in detail the first experiments with $p^{11}\text{B}$ in a magnetic confinement device.

[1] M. H. Sikora and H. R. Weller. *Journal of Fusion Energy* **35**, 538-543 (2016)

[2] S. Putvinski, D. Ryutov, and P. Yushmanov. *Nuclear Fusion* **59**, 076018 (2019)

[3] I. Ochs, E. Kolmes, M. Mlodik, T. Rubin, and N. Fisch. *Physical Review E* **106**, 055215 (2022)

[4] R. M. Magee, et al. *Nature Communications* **14**, 955 (2023)