

Abstract Submitted  
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**Effects of nuclear molecular configurations on the astrophysical S-factor for  $^{16}\text{O} + ^{16}\text{O}$** <sup>1</sup> ALEXIS DIAZ-TORRES, LEANDRO R. GASQUES, The Australian National University, MICHAEL WIESCHER, JINA, University of Notre Dame, CANBERRA COLLABORATION, JINA COLLABORATION — The impact of nuclear molecular configurations on the astrophysical S-factor for  $^{16}\text{O} + ^{16}\text{O}$  is investigated within the realistic two-center shell model based on Woods-Saxon potentials. These molecular effects refer to the formation of a neck between the interacting nuclei and the radial dependent collective mass parameter. It is demonstrated that the former is crucial to explain the current experimental data with high accuracy and without any free parameter, whilst in addition the latter predicts a pronounced maximum in the S-factor. In contrast to very recent results by Jiang et al., the S-factor does not decline towards extremely low values as energy decreases.

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