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Describing low-energy nuclear reactions with wave-packet dynamics

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The physics of nuclear reactions is crucial for understanding element creation in the Universe, and is therefore at the core of science programmes in new generation facilities. I will report on novel theoretical developments in describing low-energy fusion dynamics of heavy ions and weakly bound nuclei using the time-dependent wave-packet method. Topical applications of the method include the incomplete fusion of weakly bound nuclei at Coulomb energies [1] and resonances in stellar carbon fusion [2]. Perspectives of the method for identifying resonant behaviour in nuclear collisions will be discussed [3].

[1] M. Boselli and A. Diaz-Torres, Physical Review C 92 (2015) 044610.
[2] A. Diaz-Torres and M. Wiescher, Physical Review C 97 (2018) 055802.
[3] A. Diaz-Torres and J.A. Tostevin, arXiv: 1809.10517.

Primary author: Dr DIAZ-TORRES, Alexis (University of Surrey)

Presenter: Dr DIAZ-TORRES, Alexis (University of Surrey)

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