

Efimov trimers in ultracold Lithium 6

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Three particles can form unusual three-body bound states called Efimov trimers due to a universal attraction arising whenever the scattering lengths between the particles are much larger than the range of their interactions.

Various indirect signatures and first-time direct spectroscopy of such Efimov trimers have been demonstrated in recent experiments¹ using ultracold lithium 6 in three different spin states, where the scattering lengths are enhanced by magnetic Feshbach resonances. We found that all these measurements are indeed consistent with the universal Efimov effect, but non-universal deviations at negative energy remain to be understood and have been quantified by a variation of a short-range 3-body parameter².

¹T. B. Ottenstein et al., Phys. Rev. Lett. 101, 203202 (2008); J. H. Huckans et al., Phys. Rev. Lett. 102, 165302 (2009); S. Nakajima, et al., Phys. Rev. Lett. 105, 023201 (2010); T. Lompe et al., Phys. Rev. Lett. 105, 103201, 2010); T. Lompe et al., Science 330, 940 (2010). .

²P. Naidon and M. Ueda, Comptes Rendus Physique, v. 12, iss. 1, p. 13-26. [arXiv:1008.2260 (2010)]; S. Nakajima, M. Horikoshi, T. Mukaiyama, P. Naidon, and M. Ueda, Phys. Rev. Lett. 106, 143201 (2011).