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The emergence of an universal picture: the four-body legacy of the Efimov effect JOSE P. D'INCAO, JAVIER VON STECHER, CHRIS H. GREENE, Department of Physics and JILA, University of Colorado at Boulder — We study universality in the four-boson problem and determine its relation to the three-body Efimov physics. While we confirm the conclusion reached previously by some studies that no true Efimov effect exists for four particles, we demonstrate the existence of an universal class of four-body states that are intimately connected with Efimov states. We have found precisely two four-boson states associated to each Efimov trimer and whose ratio between their energies is a universal number, i.e., irrespective to the details of the interparticle interactions. Both energy spectrum and scattering observables manifest this fundamental connection between three- and four-body physics through the existence of a geometric scaling originated entirely from the Efimov physics. Our study open up way in which such four-body universal physics can be observed in ultracold gases through the analysis of four-body scattering observables. This work was supported by the National Science Foundation.

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