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Beyond the Efimov effect: an infinity of trimer states from subcritical attractive $1/r^2$ interactions[1] NICOLAIS L. GUEVARA, BRETT D. ESRY, Department of Physics, Kansas State University, YUJUN WANG, JILA, Department of Physics, University of Colorado — We have investigated the spectrum of three identical bosons interacting through a pair-wise sum of two-body attractive $1/r^2$ potentials. We have found an infinite number of three-body bound states even when the two-body interaction does not support any dimer state. The effect we have found thus resembles the Efimov effect, but it is *not* the Efimov effect since no scattering length can be defined in the usual sense for an attractive $1/r^2$ potential. Moreover, we show that the effective three-body potential is more attractive asymptotically than the Efimov potential. When the two-body interaction is strong enough to support dimer states, a geometrically-spaced Efimov-like spectrum appears yielding an infinite sequence of three-body bound states. We have also found that three identical fermions interacting via a subcritical attractive $1/r^2$ potential produces an infinite number of three-body bound energies, geometrically spaced like the Efimov effect. We have thus identified a new class of three-body states distinct from those discussed before, yet possessing some of the peculiar properties of Efimov effect.

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