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Weakly-Bound Bosonic States in the Strongly Interacting Regime[1] JAVIER VON STECHER, JILA, University of Colorado and National Institute of Standard and Technology, Boulder, CO 80309 — Among the most striking features of ultracold few-body physics is the universal behavior that allows the characterization of physical phenomena through a handful of parameters. In both 2D and 3D, the determination of universal behavior is challenging, and studies have mainly focused on few-body systems with up to four particles. Here, we analyze the behavior of weakly-bound bosonic states in the strongly interacting regime in two and three dimensions extending, the calculations up to N=6. Combining a correlated Gaussian basis set expansion with a complex scaling method; we extract the energy, resonances, and structural properties of bosonic system for different two-body potentials. Our calculations show a rich structure of bosonic cluster states whose analysis allows us to identify universal phenomena in two and three dimensional systems with N>4. Finally, we discuss the manifestation of these universal states in experiments with ultracold gases.

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