

I-Boson Stars

We present new, fully nonlinear numerical solutions to the static, spherically symmetric Einstein-Klein-Gordon system for a collection of an arbitrary odd number N of complex scalar fields with an internal $U(N)$ symmetry and no self-interactions. These solutions, which we dub I-boson stars, are parametrized by an angular momentum number $l=(N-1)/2$, an excitation number n , and a continuous parameter representing the amplitude of the fields. They are regular at every point and possess a finite total mass. We also present results of numerical simulations of perturbed I-boson stars, for different values of l , in order to study their stability. We show that for unstable configurations there are three possible final states: collapse to a black hole, migration to the stable branch, and explosion to infinity.