

Multi-parameter continuation methods for boson-fermion mixtures

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Abstract

In this talk, we will introduce the coupled Gross-Pitaevskii equations (CGPEs) for modeling the boson-fermion mixtures (BFM). We will discuss the existence of nontrivial solution curves of the CGPEs in some neighborhoods of bifurcation points. Based on the existence theory three multi-parameter continuation algorithms combined with the spectral collocation method are proposed for computing the ground state of BFM. We compare the efficiency of the proposed algorithms with the preconditioned imaginary time evolution method. Some numerical results will be presented.