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Superfluid phases and excitations in a cold gas of d-wave interacting bosonic atoms and molecules ZEHAN LI, University of Pittsburgh, JIANSONG PAN, National University of Singapore, W. VINCENT LIU, University of Pittsburgh — Motivated by recent advance in orbitally tuned Feshbach resonance experiments, we analyze the ground-state phase diagram and related low-energy excitation spectra of a d-wave interacting Bose gas. A two-channel model with d-wave symmetric interactions and background s-wave interactions is adopted to characterize the gas. The ground state is found to show three interesting phases: atomic, molecular, and atomic-molecular superfluidity. Remarkably different from what was previously known in the p-wave case, the atomic superfluid is found to be momentum-independent in the present d-wave case. Bogoliubov spectra above each superfluid phase are obtained both analytically and numerically.

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