

Abstract Submitted
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Tricritical physics in two-dimensional p -wave superfluids¹ FAN YANG, University of British Columbia, SHAO-JIAN JIANG, State Key Laboratory of Magnetic Resonance and Atomic and Molecular Physics, Chinese Academy of Sciences, FEI ZHOU, University of British Columbia — We study effects of quantum fluctuations on two-dimensional $p + ip$ superfluids near resonance. In the standard paradigm, phase transitions between superfluids and zero density vacuum are continuous. When strong quantum fluctuations near resonance are present, the line of continuous phase transitions terminates at two tricritical points near resonance, between which the transitions are expected to be first-order ones. The size of the window where first-order phase transitions occur is shown to be substantial when the coupling is strong. Near first-order transitions, superfluids self-contract due to phase separations between superfluids and vacuum.

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