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Critical Rotating Frequency for Superfluid Fermionic Gases across Feshbach Resonance HUI ZHAI, Department of Physics, the Ohio State University, TIN-LUN HO, Department of Physics, the Ohio State University — Vortex lattices have been observed recently in the rotating Fermionic quantum gases near Feshbach resonance. However, a much faster rotation may destroy the superfluid pairing amplitude and reveal the normal state. In this talk, we present the phase diagram for different interaction strength and rotating frequency. We discover that at resonance, pairing is so robust that it can not be destroyed by rotation. In the BCS side close to resonance, we find that the critical frequency as a function of interaction strength shows a series of plateaus as a consequence of quantized Landau levels. In a fast rotating harmonic trap, the superfluid core with vortices is surrounded by a normal cloud, and the area of the superfluid regime gradually shrinks as the increase of the rotating frequency.

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