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Dynamics of a spinor atom-SQUID RANCHU MATHEW, Joint Quantum Institute, University of Maryland, EITE TIESINGA, Joint Quantum Institute, University of Maryland and National Institute of Standards and Technology — Over the past few years, there has been a concerted effort at NIST studying the atomic analogue of a superconducting quantum interference device (SQUID). The atom-SQUID consists of a Bose-Einstein condensate in a ring trap with a rotating external weak link. The phenomena of persistent current and hysteresis have been experimentally observed in this system. We investigate the effect of the spin degree of freedom on the stability of persistent-current states and hysteresis in a spin-1 atom-SQUID. Inter-atomic interactions now allow coherent oscillations between the spin projections while conserving total magnetisation. We study the mean-field states of a spin-1 system within a two-mode approximation, where the two spatial modes are plane-wave modes with winding number zero and one. Furthermore, we calculate the Bogoliubov spectrum to study the combined effect of an external magnetic field and rotation rate on the stability and coupling of the spin and mass current.

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