

Abstract Submitted
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Persistent atomic spin squeezing at the Heisenberg limit LING-NA WU, State Key Laboratory of Low Dimensional Quantum Physics, Department of Physics, Tsinghua University, MENG KHOON TEY, LI YOU, State Key Laboratory of Low Dimensional Quantum Physics, Department of Physics, Tsinghua University; Collaborative Innovation Center of Quantum Matter — One-axis twisting (OAT) and two-axis counter twisting (TACT) are two widely discussed processes capable of dynamically generating spin squeezed states, which have potential applications to precision measurement and entanglement detection. TACT provides better spin squeezing (SS), but has not been demonstrated as its form of interaction does not occur naturally in known physical systems. Several proposals for realizing effective TACT transformed from OAT require stringent experimental conditions, in order to overcome the problems of non-stationary (oscillating) SS and continuously varying mean spin direction. We report a simple protocol that solves both problems by freezing SS at an optimal point and realizing effectively persistent SS by inhibiting further squeezing dynamics. Explicit procedures are outlined which favorably relax experimental demands and significantly brighten the prospects for realizing TACT.

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