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Building Spin-Squeezed Optical Lattice Clock CHI SHU, Harvard University, EDWIN PEDROZO, SIMONE COLOMBO, ALBERT ADIYATULLIN, ZEYANG LI, ENRIQUE MENDEZ, Massachusetts Institute of Technology, AKIO KAWASAKI, Stanford University, BORIS BRAVERMAN, University of Ottawa, VLADAN VULETIC, Massachusetts Institute of Technology — Quantum enhanced metrology promises a significant boost of the performance of sensors with a precision that surpass classical limit and enables possibilities of new generation of sensors with unprecedented sensitivity. We generate and characterize a spin-squeezed state on the optical clock transition in ^{171}Yb by combination of cavity feedback squeezing and optical state transfer. The observed precision gain over standard quantum limit (SQL) is 4.4dB. The demonstration paves the path to improve the optical lattice clocks (OLC) beyond current records stability of $510^{-17}/\sqrt{}$, which is limited by quantum projection noise.

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