Abstract Submitted
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Robust quantum memory using magnetic-field-independent atomic qubits[1] C. LANGER, R. OZERI, J. D. JOST, B. DEMARCO[2], A. BENKISH[3], B. BLAKESTAD, J. BRITTON, J. CHIAVERINI, D. HUME, W. M. ITANO, D. LEIBFRIED, R. REICHLE, T. ROSENBAND, P. SCHMIDT, D. J. WINELAND — Scalable quantum information processing (QIP) requires physical systems capable of reliably storing coherent superpositions for times over which quantum error correction can be implemented. Here, we experimentally demonstrate a robust quantum memory using a magnetic-field-independent hyperfine transition in $^9Be^+$ atomic ion qubits at a field B = 0.01194 T using Raman spectroscopy implemented with two-photon stimulated-Raman transitions. We observe the single physical qubit memory coherence time to be greater than 10 seconds, an improvement of approximately five orders of magnitude from previous experiments effectively eliminating memory errors in this system. Future QIP experiments employing this qubit will be discussed.

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