Quantum state estimation and feedback control aided by weak measurement reversal\textsuperscript{1} HERMANN UYS, PIETER DU TOIT, National Laser Centre, Council for Scientific and Industrial Research, Pretoria, South Africa, SHAUN BURD, Department of Physics, Colorado University, Boulder, Colorado, USA, THOMAS KONRAD, School of Chemistry and Physics, University of KwaZulu Natal, Durban, South Africa — We investigate state and frequency estimation of an oscillating qubit using weak POVM measurements. By employing a Fourier transform frequency estimator combined with a strategy of unitary reversal of the weak measurements, it is shown that for sufficiently strong measurements these reversals lead to improved frequency estimation. This approach opens new prospects for feedback control of qubit dynamics.

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