Estimation of a quantum interaction parameter using weak quantum measurement: theory and experiment\textsuperscript{1} MICHAEL GOGGIN, Truman State University, HOLGER HOFMANN, Hiroshima University, MARCELO ALMEIDA, University of Queensland, MARCO BARBIERI, Universite Paris-Sud, Campus Polytechnique — We investigate the metrological limits of the measurement of an interaction parameter based on a weak measurement and post-selection. A strict connection between weak values and the Fisher information of the measurement scheme is established. The resultant theory is applied to an experiment on the polarization of single photons. The experimental results support the theory and provide insight into the statistics of weak measurements.

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