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Testing Born's rule in Quantum Mechanics using a Triple slit experiment URBASI SINHA, Institute for Quantum Computing (IQC), University of Waterloo, Canada, CHRISTOPHE COUTEAU, ZACHARI MEDENDORP, IQC, Waterloo, Canada, IMMO SOELLNER, Institut fuer Experimentalphysik, Innsbruck, Austria, RAYMOND LAFLAMME, IQC, Waterloo, Canada, RAFAEL SORKIN, Syracuse University, Syracuse, NY, GREGOR WEIHS, Institut fuer Experimentalphysik, Innsbruck, Austria — In Mod. Phys. Lett.A **9** 3119 (1994), one of us (R.D.S) investigated a formulation of quantum mechanics as a generalized measure theory. Quantum mechanics computes probabilities from the absolute squares of complex amplitudes, and the resulting interference violates the (Kolmogorov) sum rule expressing the additivity of probabilities of mutually exclusive events. However, there is a higher order sum rule that quantum mechanics does obey, involving the probabilities of three mutually exclusive possibilities. We could imagine a yet more general theory by assuming that it violates the next higher sum rule. In this presentation, we report results from an ongoing experiment that sets out to test the validity of this second sum rule by measuring the interference patterns produced by three slits and all the possible combinations of those slits being open or closed. We use either attenuated laser light or a heralded single photon source (using parametric down conversion) combined with single photon counting to confirm the single photon character of the measured light.

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