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Double slit electron diffraction

We measured diffraction of electrons from a grating of light [1] and recorded a movie of the build-up of the diffraction pattern one particle at a time for the double slit [2]. In work done in Paris, macroscopic particle-wave duality with bouncing oil droplets was demonstrated for a double slit [3], which we have attempted to repeat. The philosophical implication of the oil droplet experiment is that it is acceptable to attempt to think of theories underlying quantum mechanics that have the capability to describe single Events in a deterministic fashion. The idea that the electromagnetic vacuum field under the boundary conditions presented by a double slit could be responsible for electron diffraction is decades old. Recently [4], this idea has been worked out in stochastic electrodynamics (SED) and provides a possible Explanation for double slit diffraction in a deterministic way. We investigated SED for the harmonic oscillator [5] under pulsed excitation as a test of the theory [6], and hope to extend this work to the double slit and to electrons passing by a wall, with the purpose of identifying experimental tests.

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