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Popper's Thought Experiment Reinvestigated CHRIS RICHARDSON, JONATHAN DOWLING, Louisiana State University — Karl Popper posed an interesting thought experiment in 1934. With it, he meant to question the completeness of quantum mechanics. He claimed that the notion of quantum entanglement leads to absurd scenarios that cannot be true in real life and that an implementation of his thought experiment would not give the results that QM predicts. Unfortunately for Popper, it has taken until recently to perform experiments that test his claims. The results of the experiments do not refute QM as Popper predicted, but neither do they confirm what Popper claimed QM predicted. Kim and Shih implemented Popper's thought experiment in the lab. The results of the experiment are not clear and have instigated many interpretations of the results. The results show some correlation between entangled photons, but not in the way that Popper thought, nor in the way a simple application of QM might predict. A ghost-imaging experiment by Strekalov, et al. sheds light on the physics behind Popper's thought experiment, but does not try to directly test it. I will build the physics of Popper's thought experiment from the ground up and show how the results of both of these experiments agree with each other and the theory of QM, but disprove Popper.

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