

# Experimental realisation of the double slit experiment of Ghose et al.

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## **Abstract**

Quantum Mechanics strongly differs from classical mechanics due to its intrinsic non-epistemic probabilistic nature. These differences are at the basis of the rapidly developing field of quantum information. In the past, many attempts have been devoted to build a deterministic theory reproducing all the results of QM, but where probabilities are epistemic, namely due to our ignorance of some hidden variables. One of the most interesting attempt is the dBB theory, which was built in order to reproduce all QM predictions. However, a series of recent theoretical papers have claimed that different coincidence patterns are predicted by QM and dBB when a double slit experiment is realised under specific conditions. Albeit this result is still somehow controversial, we think that an experimental result on this prediction would give a relevant contribution to solicit a definitive answer on its validity. In this letter we present the first realisation of such a double slit experiment with correlated photons produced in type I parametric down conversion. Our results confirm Standard Quantum Mechanics contradicting dBB predictions as evaluated in these recent theoretical works.

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