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【558】 Symmetry in totally destructive many-particle interference

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Quantum interference of indistinguishable bosons is indispensable for many quantum optical experiments. As in the famous Hong-Ou-Mandel effect, symmetry of the input state and symmetries in the scattering scenario can lead to destructive interference and the suppression of a large number of output events. The rules specifying which input-output combinations interfere totally destructively are summarized in so-called suppression laws. Here, we experimentally investigate the suppression law of the J_x unitary in a femtosecond laser-written waveguide structure with four photons emitted from a SPDC source. We show that totally destructive interference does not require mutual indistinguishability between all, but only between symmetrically paired particles, in agreement with recent theoretical predictions.

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