

Abstract Submitted
for the TSF21 Meeting of
The American Physical Society

Dependence of Photon Entanglement on Coincidence Window Size¹ SARAH DARBAR, EMILY PADILLA, University of Texas at Austin — We investigated the properties of entangled photon pairs as a function of the coincidence window size in an experiment with a type-I parametric down conversion source. We verified that, for coincidence windows below 10 ns, the prepared Bell states exhibited a visibility of over 95%. We furthermore observed a violation of the Bell-CHSH inequality but only for coincidence windows below 25 ns. These results show the significant implications for choosing windows for coincidence detections, since both our measured visibilities and Bell statistic parameters decreased for larger windows. We hypothesize that for larger coincidence windows there is more of a likelihood for either dark counts or additional photons from our entanglement source to set off coincidence detections. In reality, these may not be actual coincidence counts from a single pair of entangled photons. This may imply that an increased window may show more of a classical representation for our state than a quantum one.

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Date submitted: 08 Sep 2021

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