

Abstract Submitted
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Construction of operation of digital intensity interferometer in lab SAHAR NIKKHAH¹, MICHAEL LISA, Ohio State University — In the 1950's Robert Hanbury Brown invented the groundbreaking technique of “intensity interferometry,” solving several problems of Michelson (amplitude) interferometry used in astronomy. In principle, HBT offers the possibility of arbitrarily large baselines (hence arbitrarily small source resolution). However, the technology available in 1950-70 was insufficient to take advantage of this possibility, as signals from two detectors had to be combined in real time. Modern digital technology allows the capture and local storage of photon times and offline correlation, restoring the promise of very large baselines. We have studied the feasibility of such a measurement, simulating a distant star with incoherent light from a ~ 70 micron region. This source is observed by our multi-detector interferometer, four photomultiplier tubes (PMTs) several meters away. We see the expected HBT correlation in photon times between different PMTs and within each PMT. The dependence of this correlation depends on PMT separation according to expectations based on the source geometry. We will discuss the motivation for our work, the physics of HBT correlations, our experimental apparatus, and the relevance of our results for future developments in HBT astronomy.

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