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Enabling offline optical intensity interferometry for the study of stars at high resolution[1]

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Over the last decade, there has been a renewed interest in developing a modern Stellar Intensity Interferometry (SII) observatory for high angular resolution measurements of stars at optical wavelengths. The SII technique is relatively insensitive to atmospheric turbulence allowing for very large telescope baselines, thus probing small angular scales, as well as the ability to operate at short visible wavelengths, generally inaccessible to current state-of-the-art interferometers. Here, I present astrophysical results from observations with an SII system installed onto the VERITAS gamma-ray telescopes. The system utilizes an off-line approach, where the light intensity measured at each telescope is synchronously recorded to disk at nanosecond timescales, and correlated post-observation. This off-line capability allows it to be readily scaled up to an arbitrary number of telescopes, enabling an optical interferometer analogous to radio/mm observatories. The work demonstrates the feasibility of using imaging air Cherenkov telescope (IACT) arrays as SII observatories, and serves as a technological pathway for implementing SII on future IACT arrays such as the Cherekov Telescope Array.

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