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HAWC Timing Calibration NATHAN KELLEY-HOSKINS, PETRA HUENTEMEYER, Michigan Technological University, JOHN MATTHEWS, University of New Mexico, BRENDA DINGUS, Los Alamos National Laboratory, HAWC COLLABORATION — The High-Altitude Water Cherenkov (HAWC) Experiment is a second-generation high sensitivity gamma-ray and cosmic-ray detector that builds on the experience and technology of the Milagro observatory. HAWC utilizes the water Cherenkov technique to measure extensive air showers. Instead of a pond filled with water (as in Milagro), an array of closely packed water tanks with 3 PMTs each is used. The cosmic ray's direction will be reconstructed using the times when the PMTs in each tank are triggered. Therefore, the timing calibration will be crucial for reaching an angular resolution as low as 0.1 degrees. We propose to use a laser calibration system, patterned after the calibration system in Milagro. The HAWC optical calibration system uses less than 1 ns laser light pulses, directed into two optical fiber networks. Each network will use optical fan-outs and switches to direct light to specific tanks. The first network is used to measure the light transit time out to each pair of tanks, and the second network sends light to each tank, calibrating each tank's 3 PMTs. Time slewing corrections will be made using neutral density filters to control the light intensity over 4 orders of magnitude. This system is envisioned to run both continuously at a low rate, or at a high rate with many intensity levels. In this presentation, we present the design of the calibration system and first measurements of its performance.

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