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A Precision 2-D Laser Scanner for Measurement of Thermal Shift in Superconducting Devices

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A novel method developed at Argonne National Laboratory for laser scanning two-dimensional (2-D) profiles has been applied to a new instrument, the Cryoscanner, for measurement of cold mass thermal shift within the cryostat vessels of superconducting devices for particle accelerators. This paper presents the hardware, controls and data acquisition / processing methods utilized for the Cryoscanner, as well as the measurement results for the first deployment of the instrument to measure thermal shift within APS Helical Superconducting Undulator (HSCU), commissioned in 2018. Recent progress toward improving the internal laser targets for the Cryoscanner will also be presented.

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