A 3-D COORDINATE SYSTEM FOR THE NSCL

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Abstract: In 2005, The National Superconducting Cyclotron Laboratory embarked on a project to upgrade the alignment techniques used to position and measure the active beamline components. The project transitions the laboratory from a system based on optical metrology and tape measures to a true 3-dimensional measurement system using a laser tracker. This presentation gives an historical perspective and reports on the project’s progress.

AN HISTORICAL PERSPECTIVE

LASER TRACKER-BASED SYSTEM IMPLEMENTATION

The NSCL is a heavy ion nuclear physics laboratory with two superconducting cyclotrons coupled together to produce beams with energies of up to 200 MeV per nucleon. The laboratory previously used jig transits and theodolites to set up a floor grid, align magnets, and transfer the beam height from the cyclotrons to the experimental stations.

In 2005, the laboratory upgraded its alignment techniques with a tracker-based system. A new floor and wall grid was installed and calibrated. Each beamline magnet was fiducialized and its position in the grid was measured. With the completion of the measurements, the straightness and levelness of the beam axes of each magnet is being compared to the theoretical values.

AS-BUILT LABORATORY BEAMLINE LAYOUT USING TRACKER MEASUREMENTS

EARLY RESULTS:

HORIZONTAL ERROR PLOT FOR THE S800 BEAMLINE

VERTICAL ERROR PLOT FOR A BEAMLINE FROM THE K1200 CYCLOTRON TO THE GAS STOPPING STATION

PRELIMINARY CHECK OF MONUMENT MOTION AFTER SIX MONTHS

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