

Machining Scintillator Tiles for the STAR Forward Upgrade

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For the past 20 years, STAR has been one of the foremost collider experiments investigating the proton structure. Recently STAR has begun constructing new detectors for the “Forward Upgrade.” The upgrade will equip STAR with new capabilities, e.g., measuring both the hadronic and electromagnetic components of jets produced at forward pseudorapidities ($2.5 < \eta < 4$) close to the proton beamlines. The upgrade will be composed of several main components such as tracking detectors for charged particles, an electromagnetic calorimeter and a hadronic calorimeter (HCal). The HCal will be composed primarily of iron absorber plates and 18,000 plastic scintillator tiles to detect particles passing through the detector’s face. The machining of the scintillator tiles has been shared through Abilene Christian University (ACU), Ohio State University, and UCLA. ACU has been responsible for cutting and milling of approximately 7,200 scintillator tiles. ACU’s manufacturing process was tailored to fit new facilities developed by the university to support on-campus research. The specific manufacturing process developed at ACU and the adaptations developed during production will be presented.