

APR15-2015-000568

Abstract for an Invited Paper  
for the APR15 Meeting of  
the American Physical Society

**Tom W. Bonner Prize in Nuclear Physics Talk: Tracking Detectors in the STAR Experiment at  
RHIC**  
HOWARD WIEMAN, Lawrence Berkeley National Laboratory

The STAR experiment at RHIC is designed to measure and identify the thousands of particles produced in 200 GeV/nucleon Au on Au collisions. This talk will focus on the design and construction of two of the main tracking detectors in the experiment, the TPC and the Heavy Flavor Tracker (HFT) pixel detector. The TPC is a solenoidal gas filled detector 4 meters in diameter and 4.2 meters long. It provides precise, continuous tracking and rate of energy loss in the gas ( $dE/dx$ ) for particles at  $+ - 1$  units of pseudo rapidity. The tracking in a half Tesla magnetic field measures momentum and  $dE/dX$  provides particle ID. To detect short lived particles tracking close to the point of interaction is required. The HFT pixel detector is a two-layered, high resolution vertex detector located at a few centimeters radius from the collision point. It determines origins of the tracks to a few tens of microns for the purpose of extracting displaced vertices, allowing the identification of D mesons and other short-lived particles. The HFT pixel detector uses detector chips developed by the IPHC group at Strasbourg that are based on standard IC Complementary Metal-Oxide-Semiconductor (CMOS) technology. This is the first time that CMOS pixel chips have been incorporated in a collider application.