

The Design and Study of RICH Detector for Super Tau-Charm Facility

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The Super tau-Charm facility (STCF) project, which is an electron-positron collider at the center-of-mass 2~7 GeV, is under exploring and will play crucial role in the high density frontier of elementary particle physics. The PID detector in STCF serves an excellent PID capability for charged hadrons. The effective PID is required to reach a statistical separation power better than 3 sigma to fulfill the desired physics goals. In the conceptual design, RICH detector is one suitable candidate at STCF barrel. The RICH consist of 12 identical block modules. C6F14 is chosen as the radiator, followed with light propagation zone, photo-cathode, multiplier and anode. The threshold of the RICH is less than 1 GeV/c to connect to the PID power of tracking system and can reach to 2 GeV/c. Geant4 simulations are performed to study the expected performance. By applying the reconstruction algorithm, > 3 sigma separation capability can be reached. A beam test has also been performed on our prototype.

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