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A Charged Particle Identification Detector in the Forward Region of SuperB

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New generation flavor factories like SuperB require very good charged particle identification. In SuperB, the barrel region is covered by a new detector based on the successful BaBar DIRC –the FDIRC, see separate contribution at this conference. To extend this excellent coverage down in polar angle, an additional detector has been designed for the forward region. Thin enough to fit between the drift chamber and the calorimeter endcap, it is made of 12 fused silica tiles arranged perpendicular to the beam axis and covering 30 degrees in azimuth each. Charged tracks crossing this area create Cherenkov photons. Part of this light is trapped by total internal reflection and propagates until the tile outer radius where it is detected by fast photon detectors. Both the photon timing and position are recorded and the pi/K separation is provided by the analysis of the photon distribution in this two-dimensional space. In order to achieve a 3 sigma separation up to 3 GeV/c, an excellent timing is needed, given the short path length (2 meters). This ambitious goal requires both fast detectors and new ultra-fast electronics (few ps accuracy), developed jointly by the LAL Orsay and the CEA/IRFU.

A prototype using a MCP-PMT coupled to two fused silica radiator bars has been tested in the SLAC Cosmic Ray Telescope. We review the results achieved and present the next steps required to have this detector become part of the SuperB baseline, such as potential applications outside SuperB.

for the collaboration

The SuperB PID group

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