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New Electronics Developments for the SuperB Charged Particle Identification Detectors

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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. Each of the 12 FDIRC photon cameras will house 48 MaPMTs, providing excellent timing capability for single photons (TTS ~140 ps). When compared with BaBar, the increase in luminosity ($\times 100$) and background makes it necessary to implement new front-end electronics with higher time precision (~100 ps rms), higher hit rate capability (few MHz/pixel), and small dead time (< 5% at 1MHz). The electronics is based on an ASIC with a new architecture, performing simultaneous time and charge measurement at high rate.

To extend this excellent coverage, an additional detector has been designed for the SuperB forward region. The 12 thin fused silica tiles arranged perpendicular to the beam axis generate Cherenkov photons which will propagate until they are detected by fast MCP-PMTs. Both the photon timing and position are recorded to perform the pi/K separation. The need for excellent time resolution requires both fast detectors and new ultra-fast electronics, developed jointly by LAL Orsay and CEA/IRFU. It is based on a new generation TDC able to reach an accuracy of a few ps while working directly with analog signals.

The poster will focus on these two original electronics developments and describe the different tests already performed, including those on the SLAC Cosmic Ray Telescope.

for the collaboration

The SuperB PID group

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