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Proximity focusing RICH with TOF capabilities

A proximity focusing RICH with aerogel radiator has been studied to further improve the pion-kaon separation in the forward region of the Belle spectrometer. Such a proximity focusing RICH counter is also a very fast detector, in particular if a micro-channel plate (MCP) PMT is used as the photon detector. With its excellent timing properties, the same device could also serve as a time-of-flight counter and thus supplement other identification methods, in particular for low momentum tracks. Cherenkov photons emitted in the radiator medium (aerogel) as well as in the entrance window of the PMT could be used for the time-of-flight measurement. A prototype of this novel device using BURLE 85011 64-anode, microchannel plate PMT, was tested on the bench and in the test beam at KEK. Excellent performance of this counter could be demonstrated. In particular, a good separation of pions and protons was observed in the test beam data with a time-of-flight resolution of about 35ps (rms) for Cherenkov photons produced in the PMT window.

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