The RICH detector of the NA62 experiment at CERN

INFN Firenze, INFN Perugia, CERN

Requirements

- Separate $\pi-\mu$ at $5 \times 10^{-3}$ for 15 GeV < $p$ < 35 GeV
- Measure track time at 100 ps (to avoid pile-up with the Gigatracker)
- Main charged Trigger

Detector

- Neon Gas at atmospheric pressure
- Vessel: 17 m long, 3 m diameter
- 2 spots of ~1000 PMT (hex packing 18 mm side)
- Mosaic of hexagonal mirrors (MARCON company, Italy):
  - 17 m Focal Length
  - 1 m diameter, 2.5 cm thick glass
  - Aluminum deposit with MgF$_2$ coat
  - piezo actuators for alignment

Electronics

- NINO ASIC as fast Time Over Threshold discriminator
- HPTDC with 100 ps LSB
  - TELL1 board (LHCb) final
  - CAEN V1190 (128ch) for test beam

11° Pisa Meeting on Advanced Detectors, May 24-30, 2009

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The light detection

- Hamamatsu R7400 U03 Metal package phototube
  - 16 mm diameter, 8 mm active diameter, 8 dynodes
  - 185 nm – 650 nm, 420 nm peak sensitivity
  - UV glass window, Bialkali cathode
  - Gain 7 x 10^5 (typ.), transit time 5.4 ns, transit time spread 0.28 ns

- Winston Cones covered with Mylar
- 1 mm thick quartz window

TEST BEAM RESULTS (NIM A 593 (2008), 314)

- \(N_{\text{Hits}} \approx 17\)
- \(\Delta t_{\text{Event}} \approx 70\) ps
- \(\Delta \theta_c \approx 50\) \(\mu\)rad