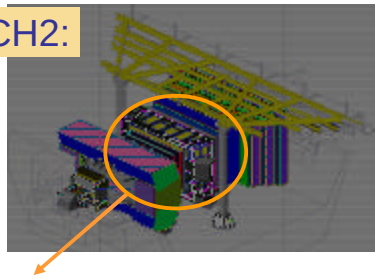
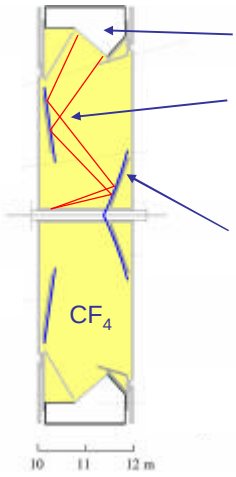
Thin Film coating

Development of reflective coatings for Ring Imaging CHerenkov detectors

LHCb/RICH2:





Pixel HPD photodetectors

40 flat mirrors:

- 41 x 38 cm2
- Average incidence 48°

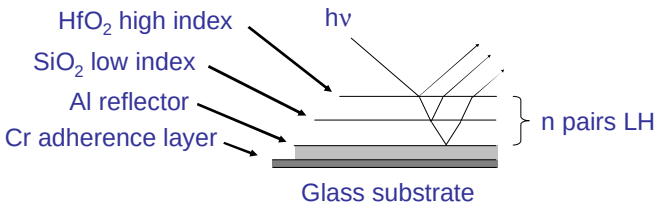
56 spherical mirrors:

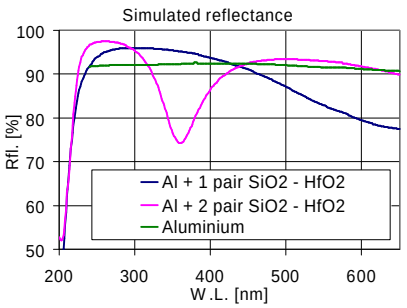
- curvature radius 8.6m
- Hexagonal
- Circumscribed in ϕ=51cm
- Average incidence 21 °

Substrates: 6 mm thick polished borosilicate glass

Reflective layers:

Metal reflector + n pairs of low and high refractive index layers for enhanced reflectance in the 200 – 450nm range





1 pair SiO_2-HfO_2:

- Best integral reflectance in spectral range 250 – 450 nm
- Rejection of short wavelength where chromatic aberration is not negligible

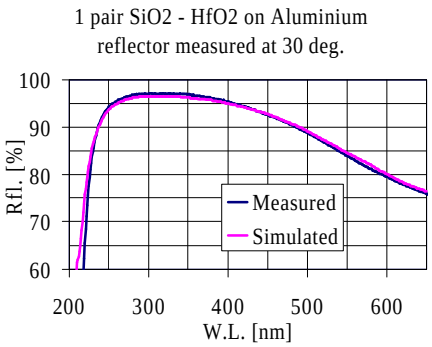
Mirror coatings at TA1-SD:

- Large evaporation plant operational at TA1-SD (ϕ 1 meter)
- Electron gun and joule heaters technology

- Reflectance measurements with CERN VUV reflectometer

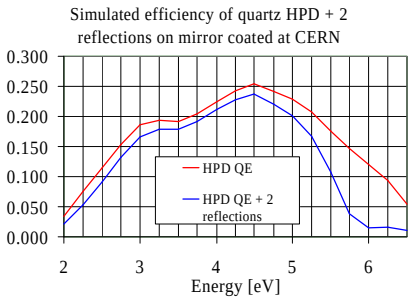
Series production (~100 mirrors) started June 2004 with a production rate of 2 mirrors per week

Performances:



Measured reflectance match the simulations

Reflectance tuned to the spectral response of the HPD photodetector



Hard surface dielectric layer

→ efficient protective layers

→ easiness for cleaning