The average surface reflectivity of the DIRC quartz exceeds 99.8% / m. Not all photons are caught by total reflection. The typical RMS surface roughness is about 400 nm (visible, blue), has a pathlength of 0.5nm. The average transmission achieved in the polished quartz bars is 99.8% / m.

Cherinkov radiators are 4.9 m long rectangular bars (17mm thick, 35 mm wide) made of synthetic fused silica. Not all photons are caught by total reflection. Losses in the bar are due to absorption in the bulk material and reflections on the surface imperfections. A typical photon has a wavelength of 400 nm (visible, blue), has a pathlength of 6 - 10 m and experiences 700 bounces before exiting. The required high optical quality of the material became available after the demand for optical fibers. Fused silica is a synthetic amorphous silicon dioxide which can be polished to high surface precision and is very radiation hard compared to natural quartz. The exit direction of each photon arriving within a few nsec of the expected arrival time is combined with the photon number to provide a measurement of the photon arrival time.

The exit angle range for a track measured by the DIRC with the momentum measured in the tracking system (vertex detector, drift chamber) acts as light guide; the original photon direction is preserved. The wedge is a prism which magnifies the exit angle by a factor n2 / n1 (up to ambiguities left/right and up/down). The wedge is a prism which magnifies the exit angle by a factor n2 / n1. The wedge is a prism which magnifies the exit angle by a factor n2 / n1. The wedge is a prism which magnifies the exit angle by a factor n2 / n1.

The particle track (red line) is extrapolated to the distance to the photomultiplier plane ("screen"). Each of the 12 sectors carries a high voltage crate. The average photon number is higher.

The picture shows a DIRC bar during a cosmic event with magnetic field on. The particle track (red line) is extrapolated to the distance to the photomultiplier plane ("screen"). One of the SOB doors is open showing the phototubes.

One of the SOB doors is open showing the phototubes.