

# The LHCb RICH silica aerogel

## performance with LHC data

Davide Luigi Perego

ISTITUTO NAZIONALE DI FISICA NUCLEARE SEZIONE DI MILANO-BICOCCA

On behalf of the LHCb RICH Group



http://lhcb.web.cern.ch/lhcb/ https://moby.mib.infn.it/lhcb/

## Silica Aerogel

- Hygroscopic or hydrophobic linked network of SiO<sub>2</sub>
- Refractive index tunable in the range 1.008–1.1 during production to match physical requirements
- Very good optical properties (transmittance and refractive index)
- Excellent refractive index homogeneity  $\sigma(n-1)/(n-1) < 1\%$
- Refractive index dispersion law measured at several wavelengths

## Integration in the RICH1 detector







### **Performance with LHC data**

- 16 blocks with different sizes
- Refractive index n  $\sim$  1.03 (momentum range 1–10 GeV/c)
- Clarity factor C < 0.006  $\mu$ m<sup>4</sup>/cm
- 300  $\mu$ m-thick D263 UV filter placed downstream
- Cosmic events (with the LHCb configuration) taken before the first pp collisions
- Data taking started in 2009 at the LHC start–up ( $\sqrt{s} = 900$  GeV)
- Degraded resolution observed at  $\sqrt{s} = 900$  GeV



 Investigation of possible causes on the way with the much higher statistics at  $\sqrt{s} = 7$  TeV



#### **Experimental evaluation of the forward scattering contribution**

Laser

Aerogel block





Poster presented at the 7<sup>th</sup> International Workshop on Ring Imaging Cherenkov Detectors (RICH2010) – Cassis (F)