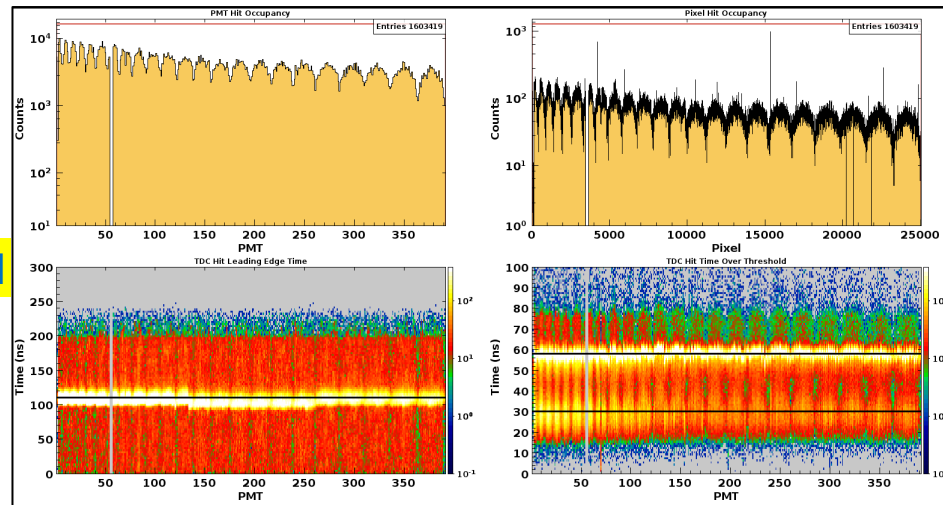


RICH status

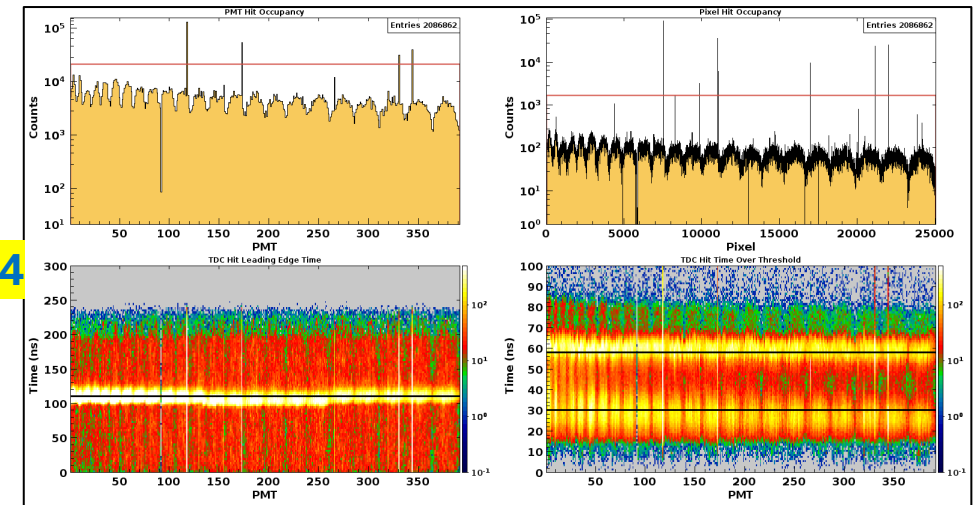
- The detector is regularly taking CLAS12 data since the completion of the second module installation
- Hardware maintenance interventions
 - replacement of the air compressor of the electronics cooling system (Sept. 23): sent to repair, still under investigation
 - upgrade of the front end electronics firmware (Jan. 24): faster initialization, more reliable performance
 - replacement of the LV boards (second half of 24): CAEN boards suffered various failures
- Few failures happened during the nuclear target data taking (Dec.23 – Jan. 24)
 - one dead PMT in sector 1
 - few dead channels on 3 PMTs of sector 1 and 1 PMT in sector 4

Less than 1% of the readout channels not functioning

sector 1



sector 4



Several software developments

- revision of the offline monitoring software
- revision of the calibration software
- implementation of the RICH in the CLAS12 software simulation package
- new alignment software (under test)
- new PID based on pattern recognition and Machine Learning (test)

Data analysis

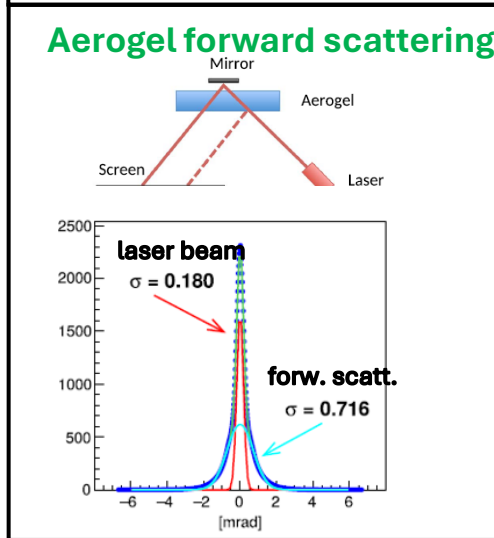
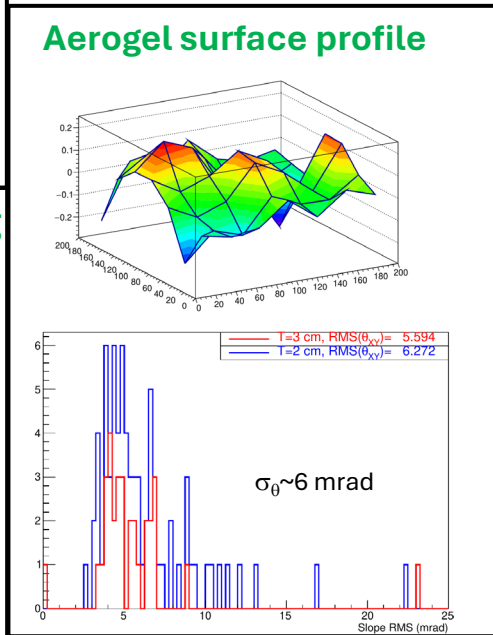
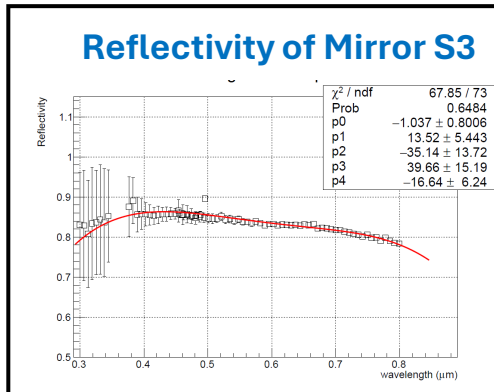
- comparison of RICH performance in pass2 vs pass1 cooking
- first look at single beam spin asymmetry in SIDIS K⁺ with RICH ID (S. Vallarino, PhD thesis)

Monte Carlo simulation of the RICH

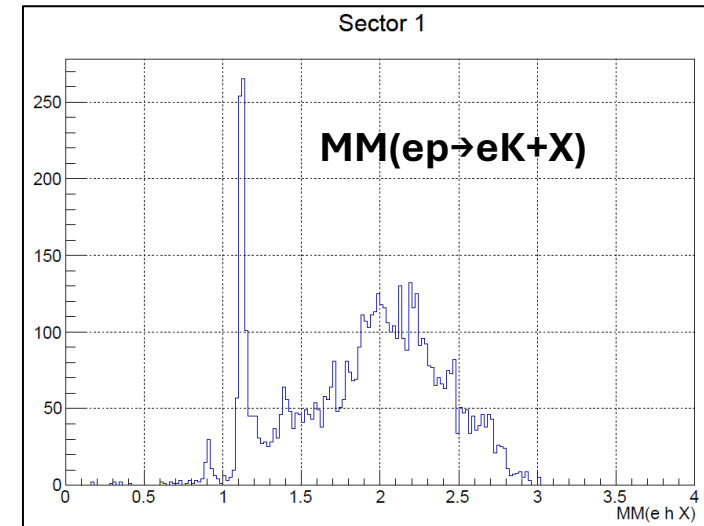
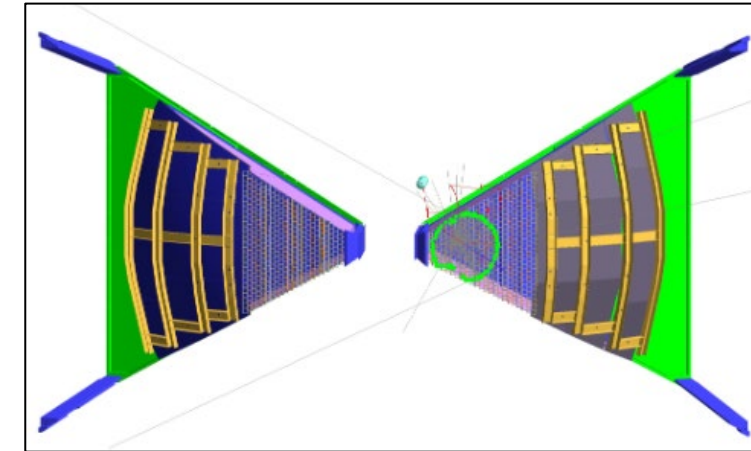
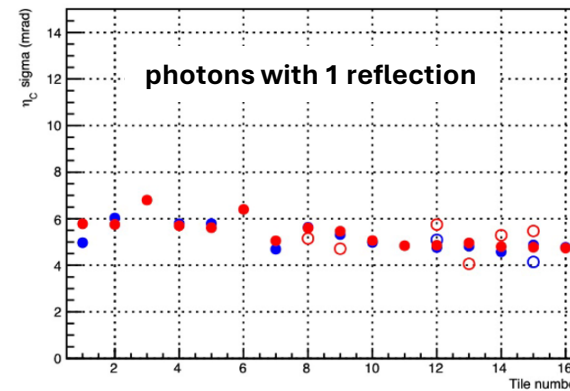
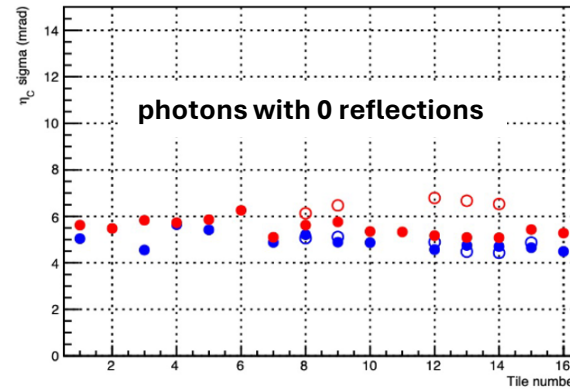
The RICH is now fully integrated in the CLAS12 simulation package

A fine tuning of the optical processes in GEANT4 based on the characterization measurements done on the various components is in progress

- mirrors: reflectivity, surface accuracy, roughness
- aerogel radiator: transparency, Rayleigh scattering, forward scattering, surface effects



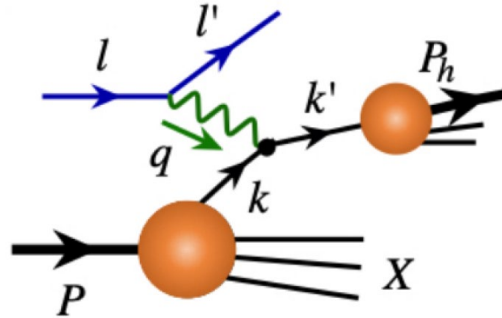
Cherenkov angle resolution
red: exp data blue: simulation



SIDIS with kaons

S. Vallarino, PhD thesis

$e p \rightarrow e K + X$



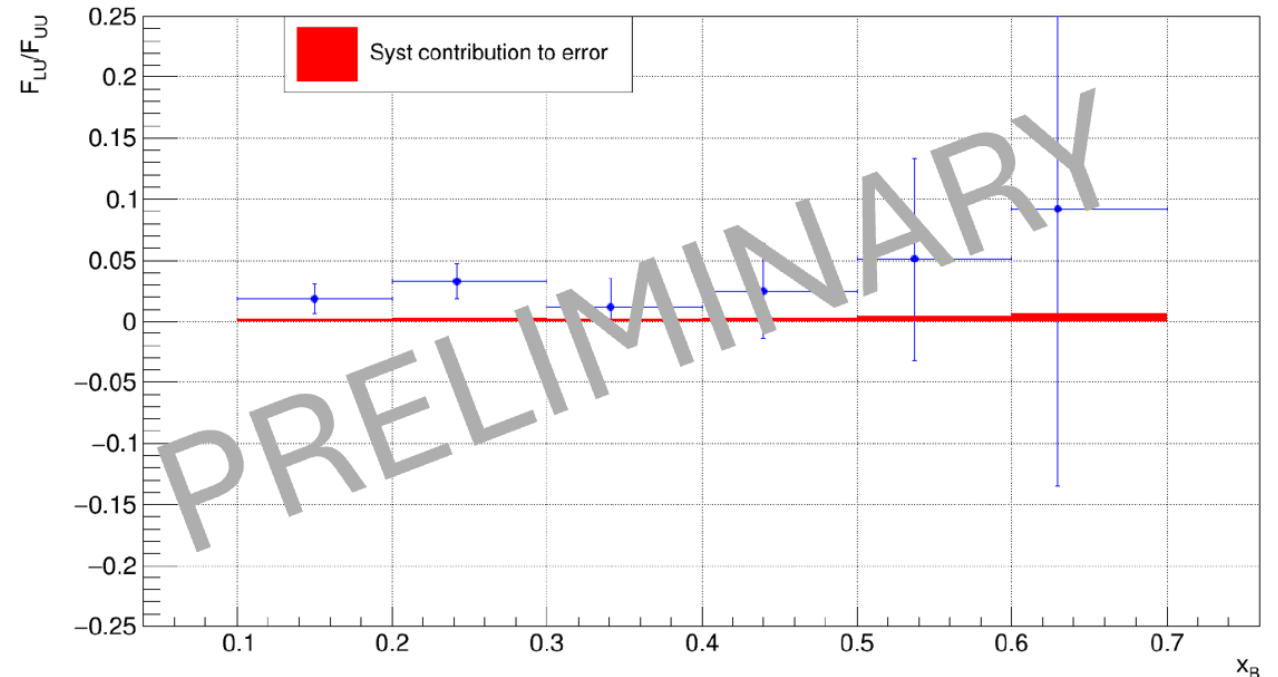
$$A_{LU} = \frac{d\sigma^+ - d\sigma^-}{d\sigma^+ + d\sigma^-} = \frac{\sqrt{2\varepsilon(1-\varepsilon)} F_{LU}^{\sin\phi}}{F_{UU}}$$

RG-A spring 2019 data

- liquid hydrogen unpolarized target
- 10.2 GeV polarized electron beam
- CLAS12 with 1 RICH sector

The scattered electron is detected in CLAS12,
the kaon in the RICH

Analysis to be finalized including all the hydrogen
and deuteron data for flavor separation



Richieste economiche

- Non ci sono richieste specifiche di costruzione/manutenzione
- Al momento non sono previsti per il 2025 interventi di manutenzione di competenza INFN
- Missioni: a parte le richieste per i turni di CLAS12, si richiede una quota di 5k di Ge dedicate al lavoro di calibrazione