

Dipole Moments

HVP

Niklaus Berger

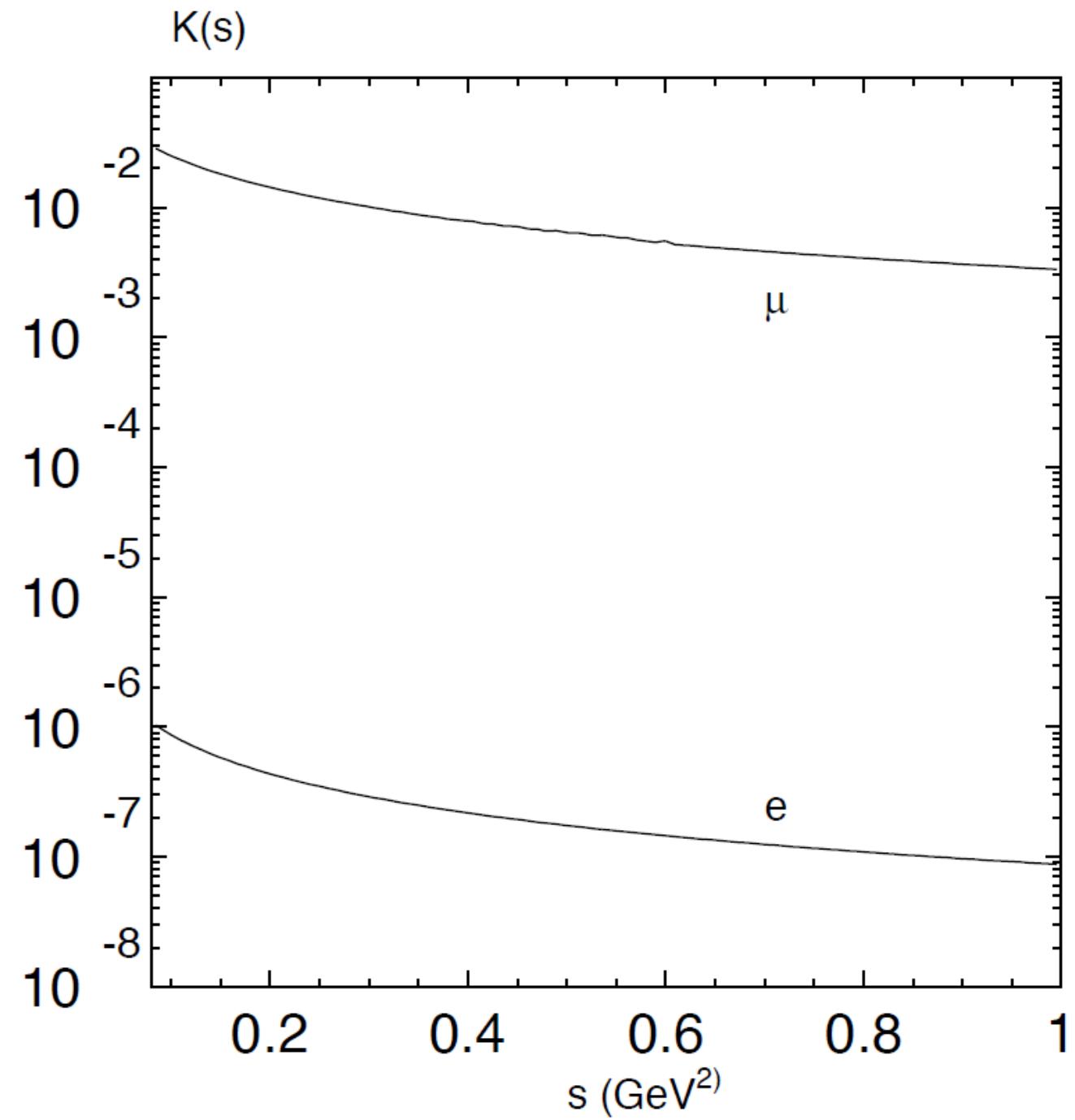
Institut für Kernphysik, Johannes-Gutenberg Universität Mainz

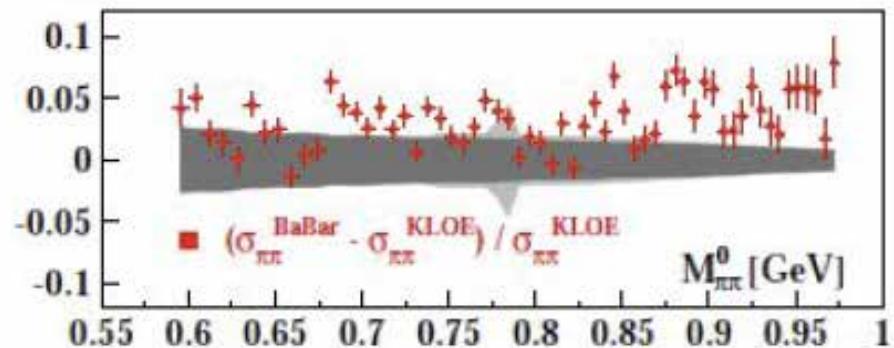
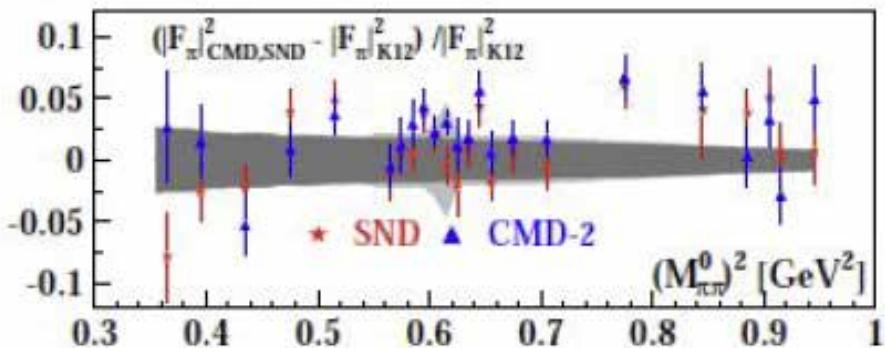
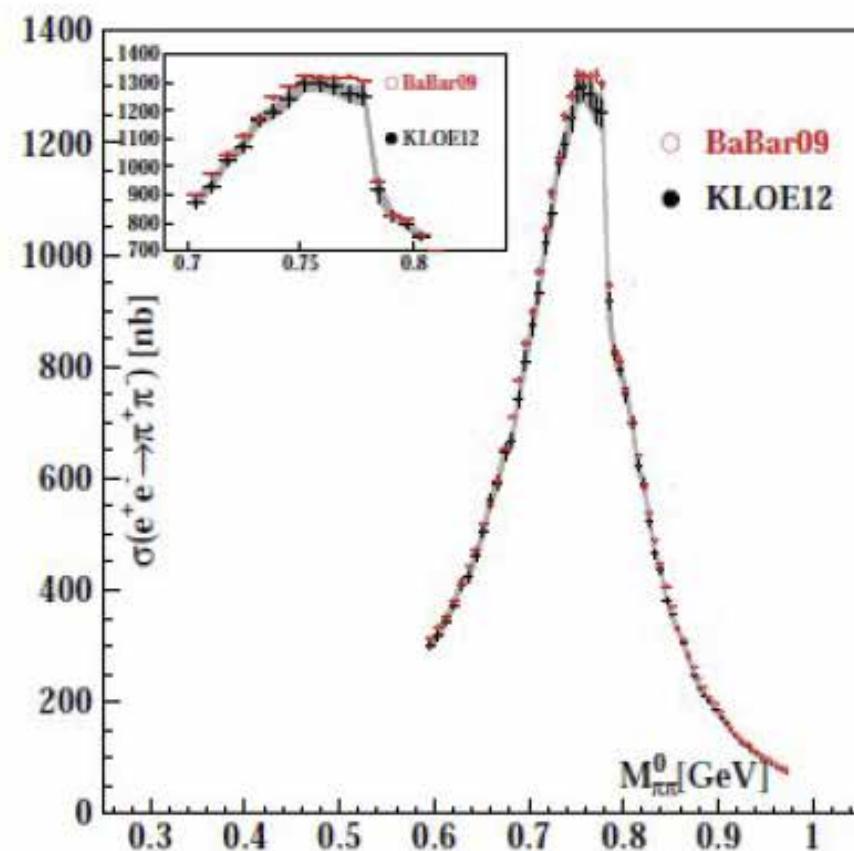
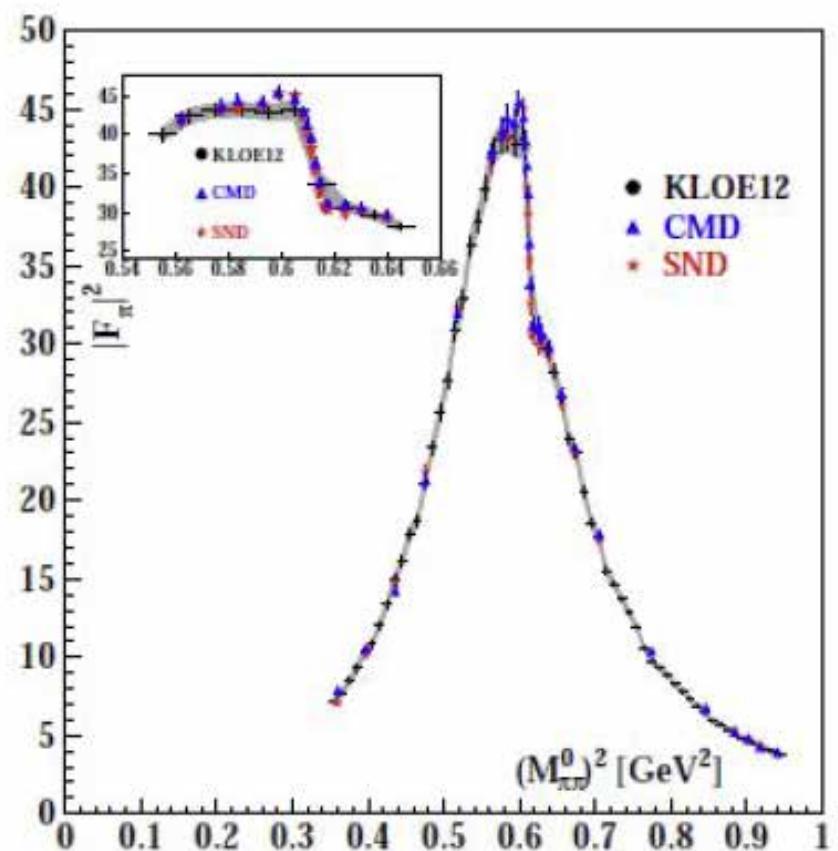


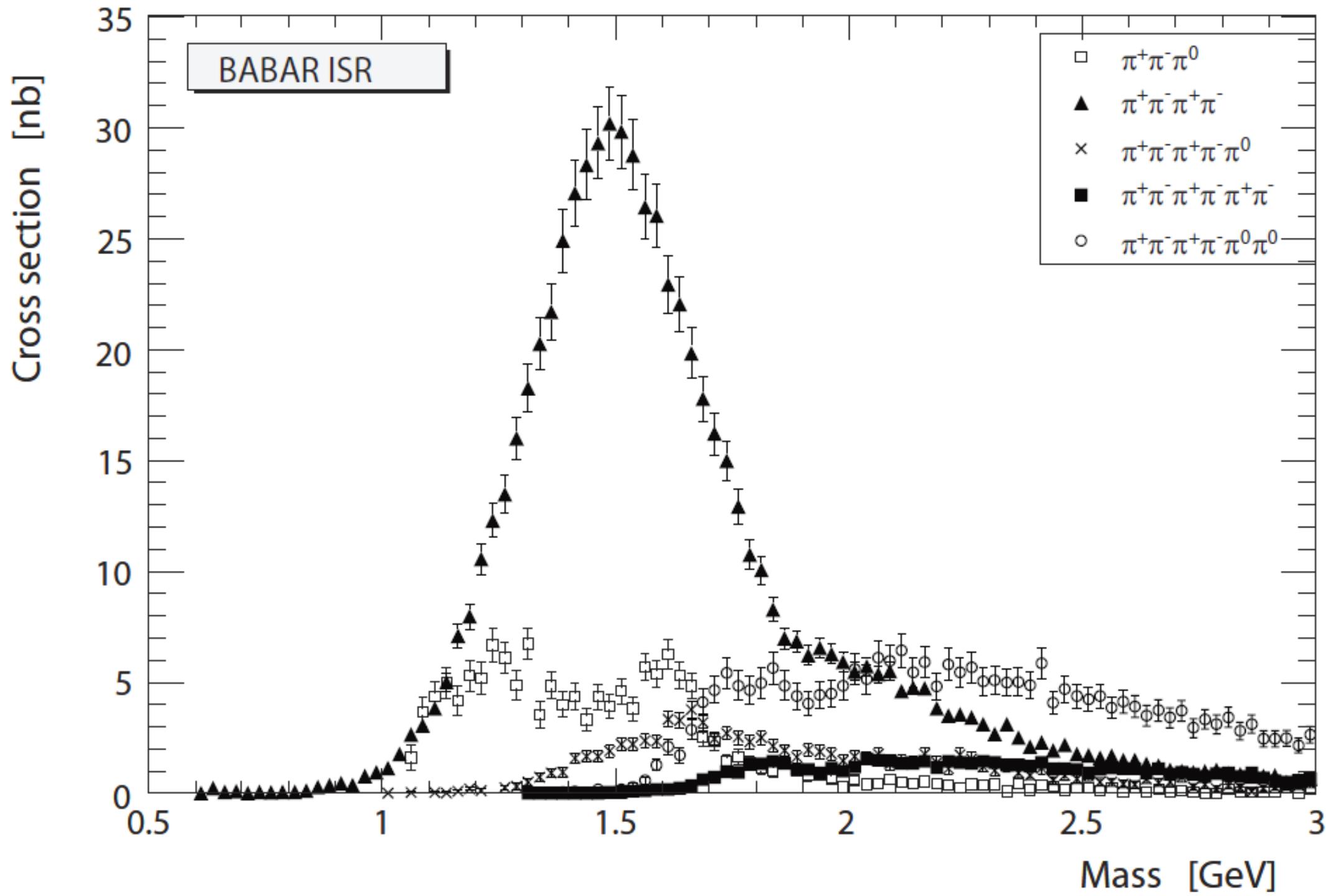
Advanced Topics in
Subatomic Physics WS15/16

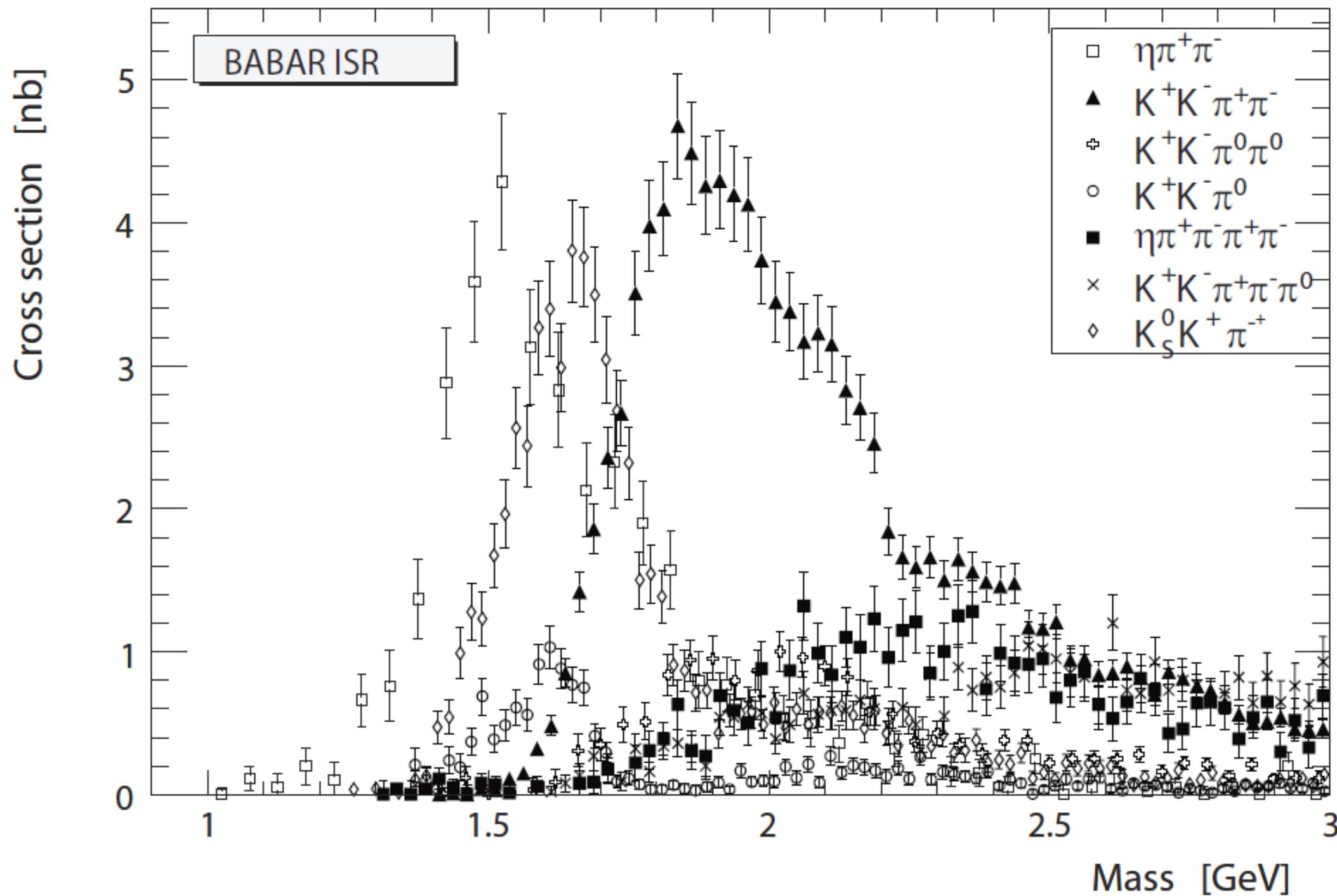


Cluster of Excellence Precision Physics,
Fundamental Interactions and Structure of Matter













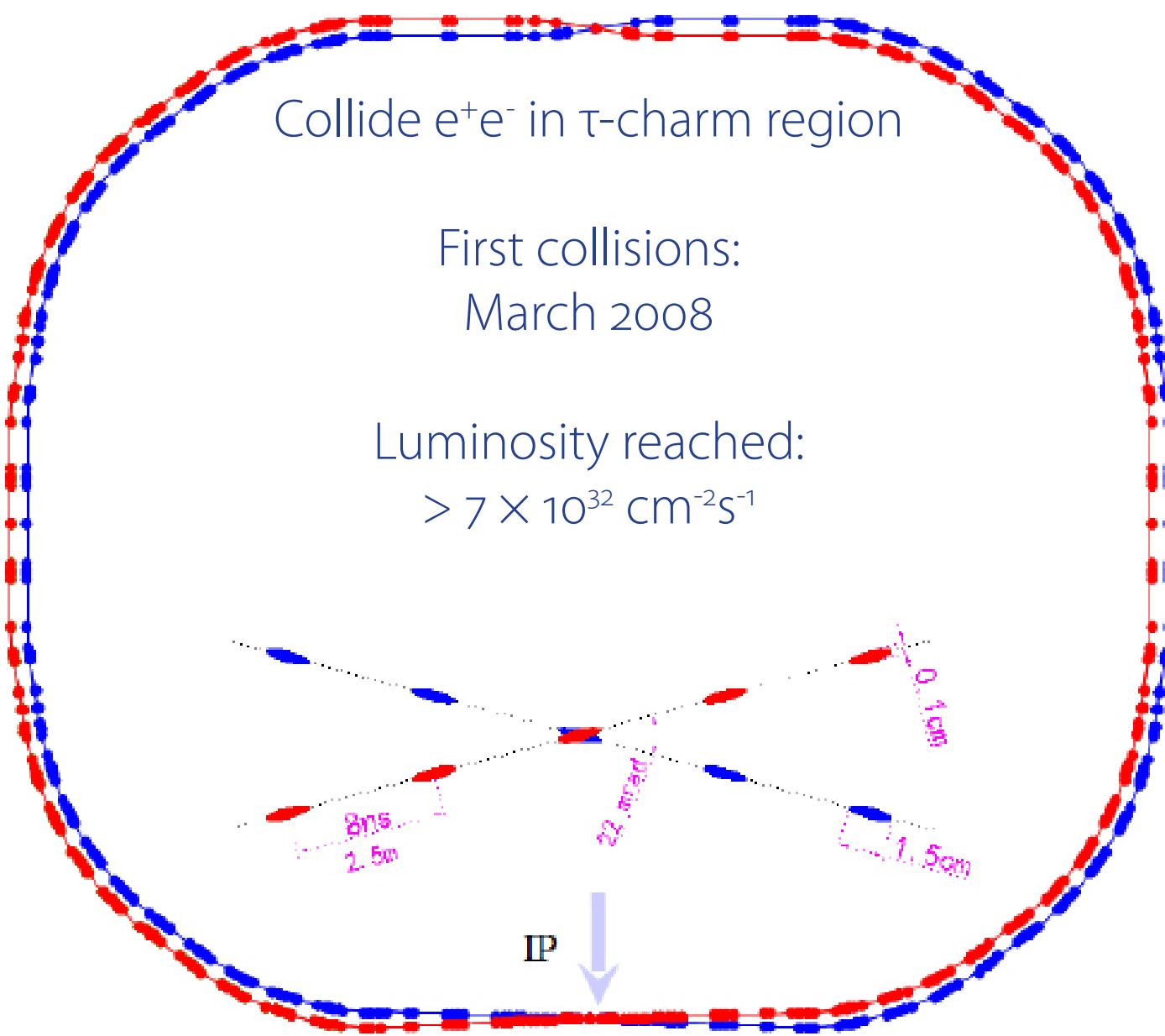


BEPC II

Collide e^+e^- in τ -charm region

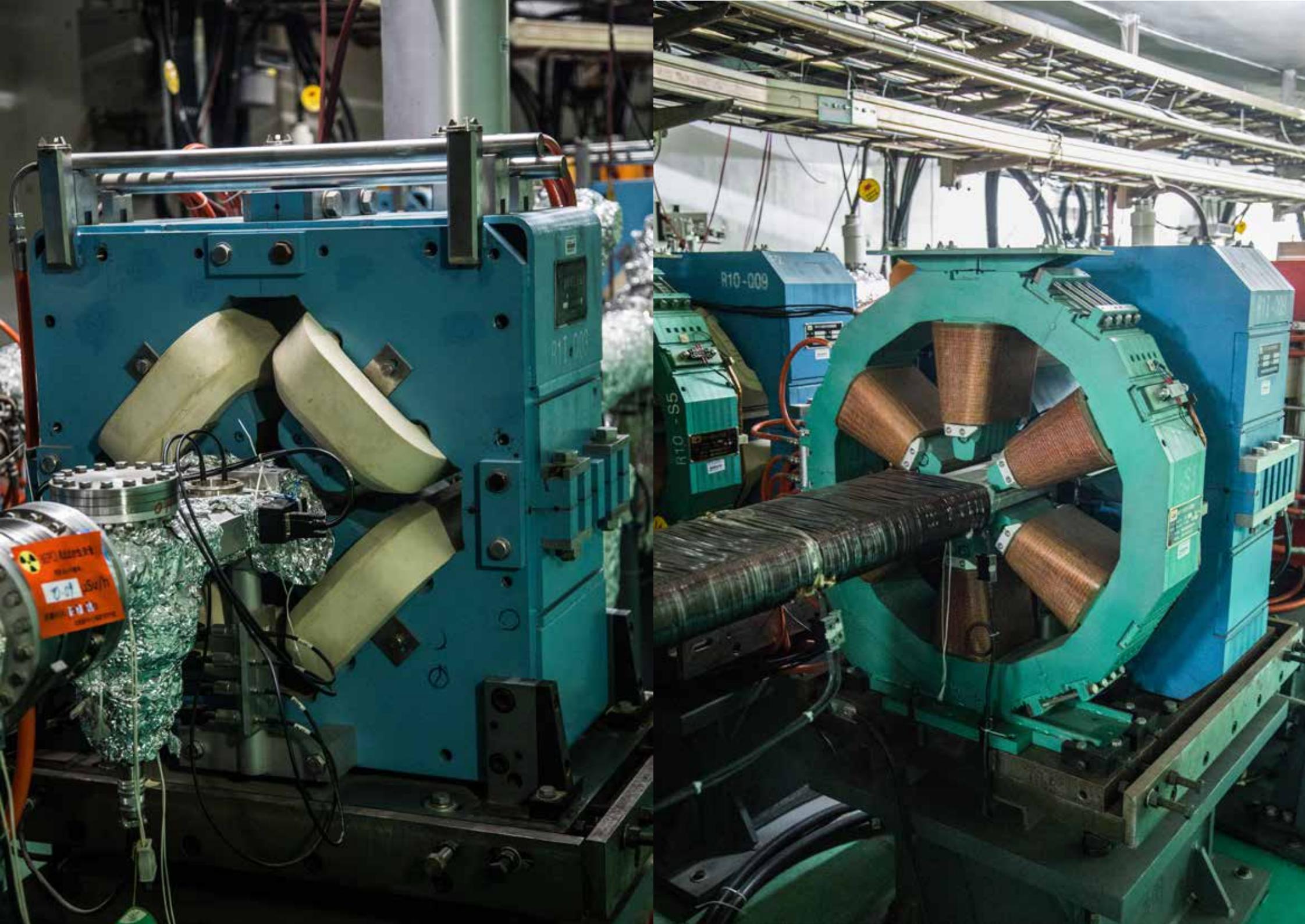
First collisions:
March 2008

Luminosity reached:
 $> 7 \times 10^{32} \text{ cm}^{-2}\text{s}^{-1}$









S19

MEGA
INSTRUMENTS AG

频激励 RF On
发射机开 Kvst
腔冷却 Cavit
高频老炼 Cavit
正常状态 Norm

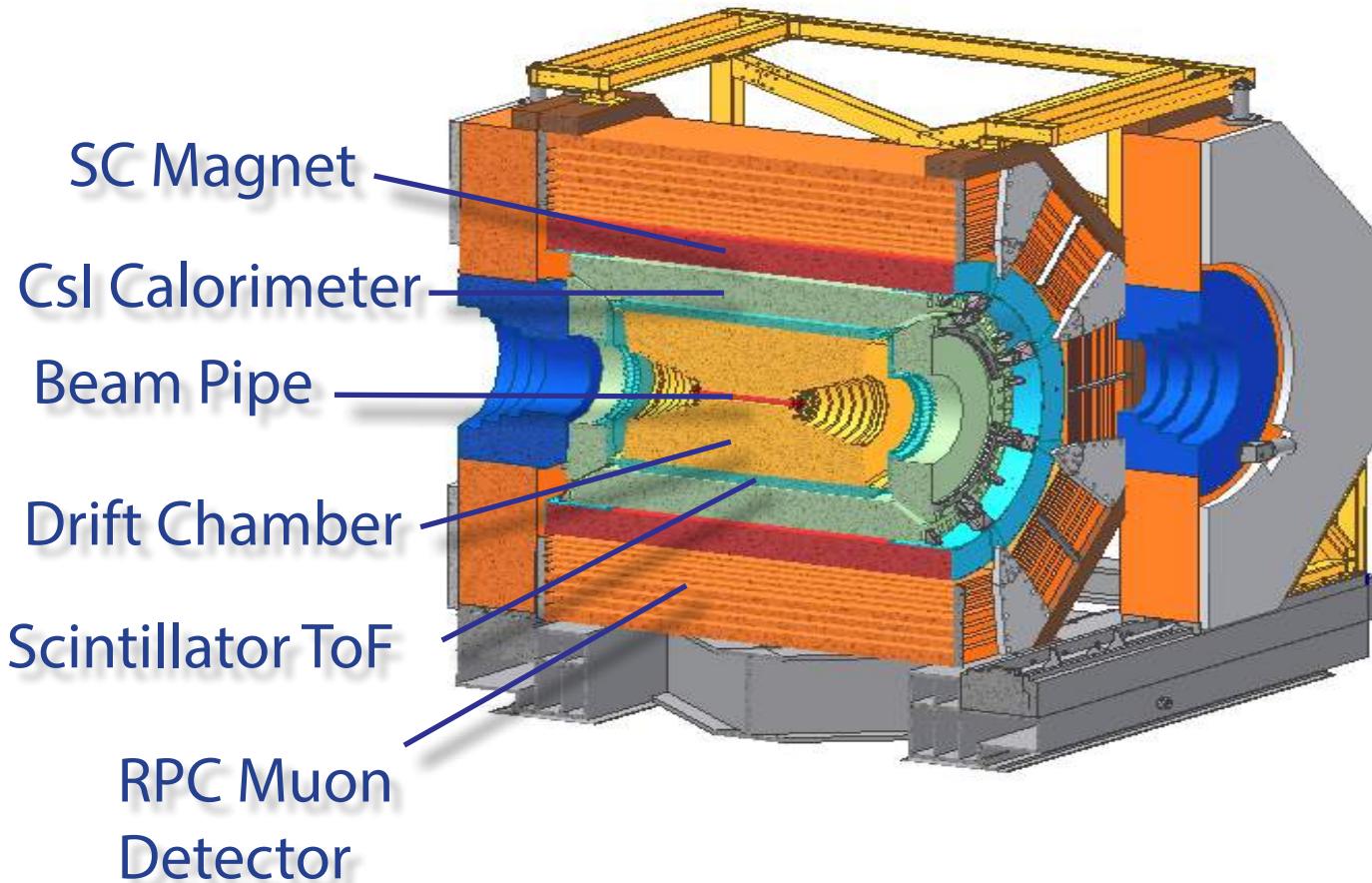
055
054



PICH







Excellent tracking and calorimetry:

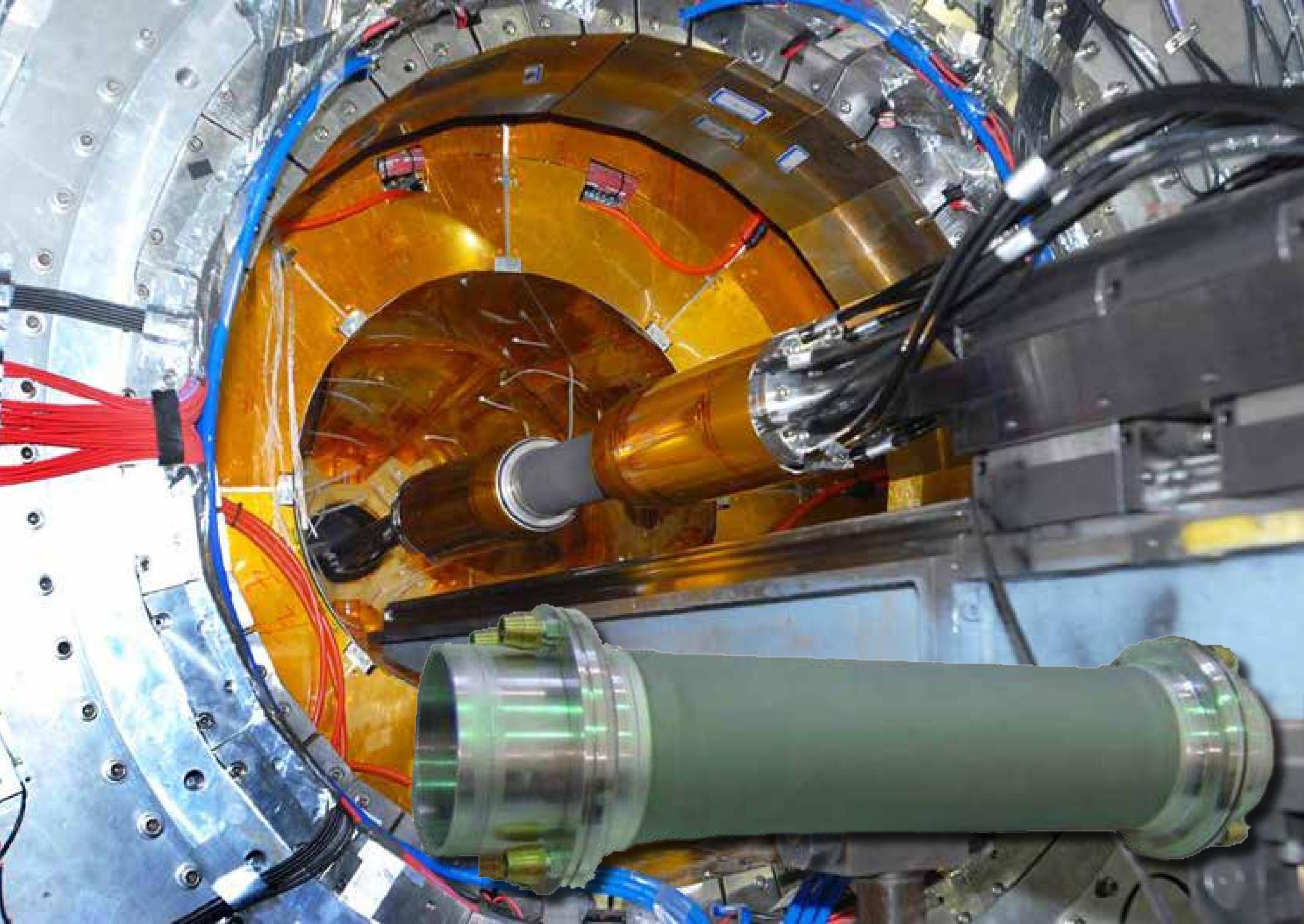
Tracks:

$$\sigma_p/p = 0.58\% \text{ @ } 1 \text{ GeV}/c$$

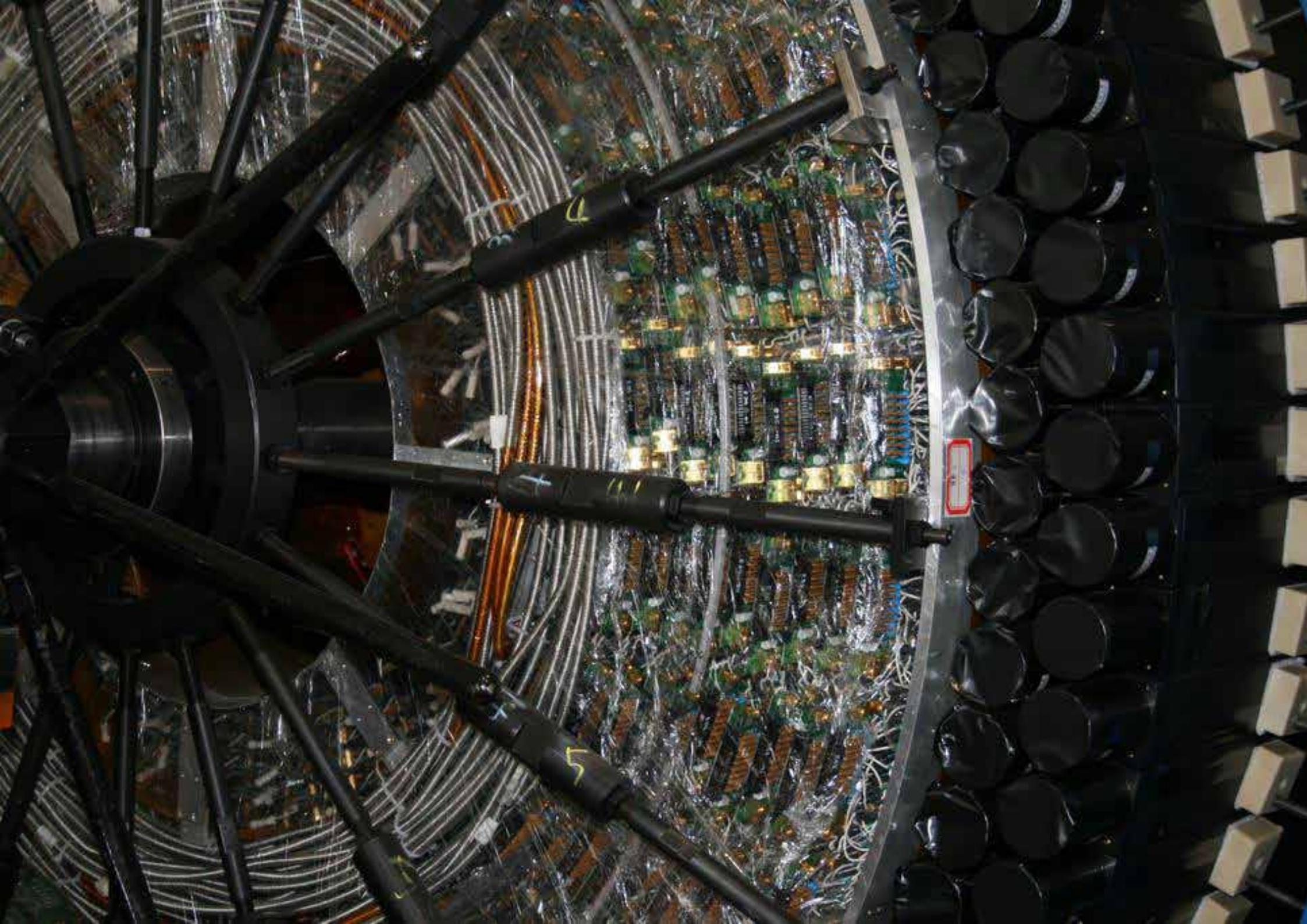
Photons:

$$\sigma_E/E = 2.5\% \text{ @ } 1 \text{ GeV}$$

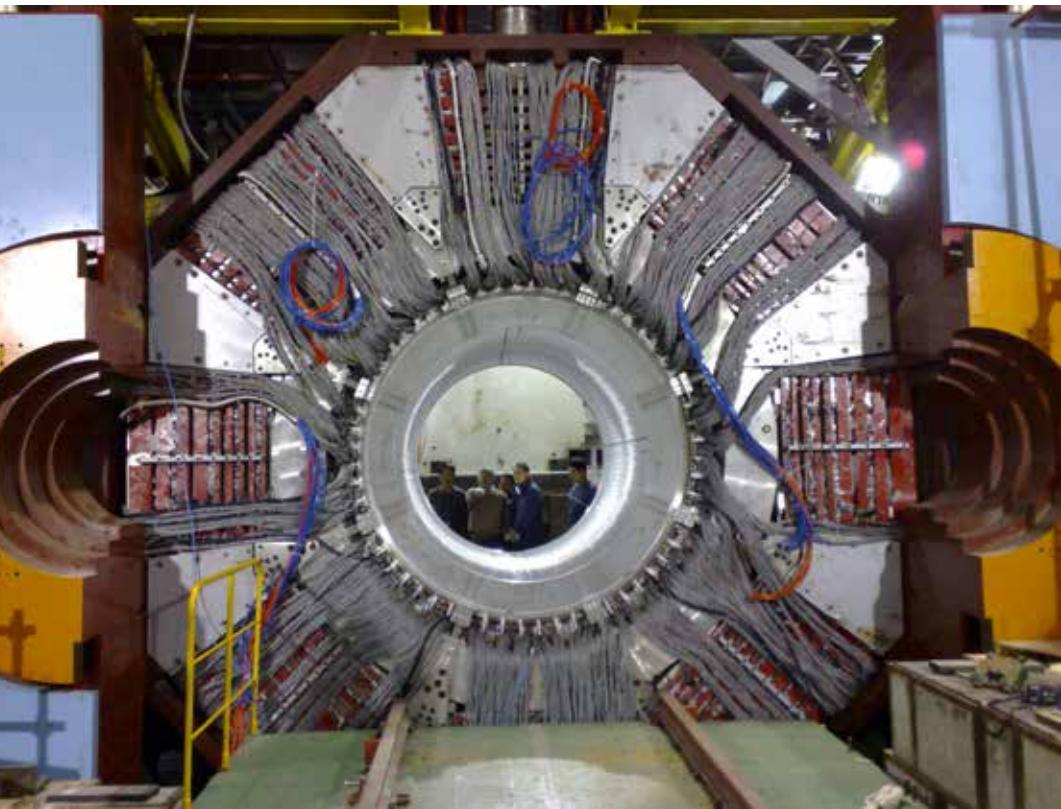
Read-out at up to 6 KHz











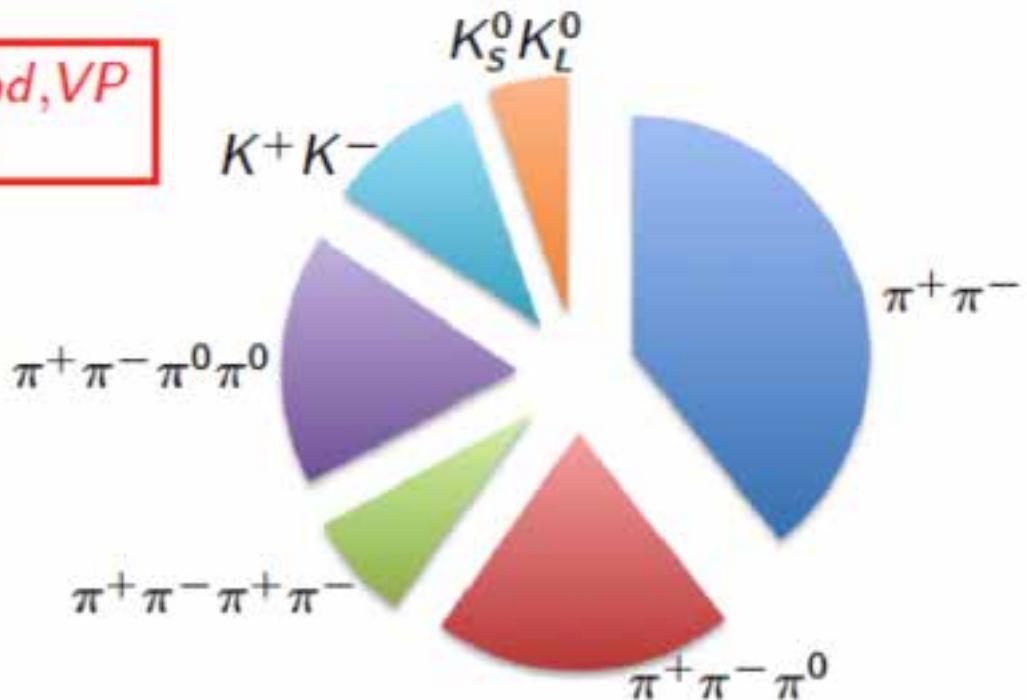




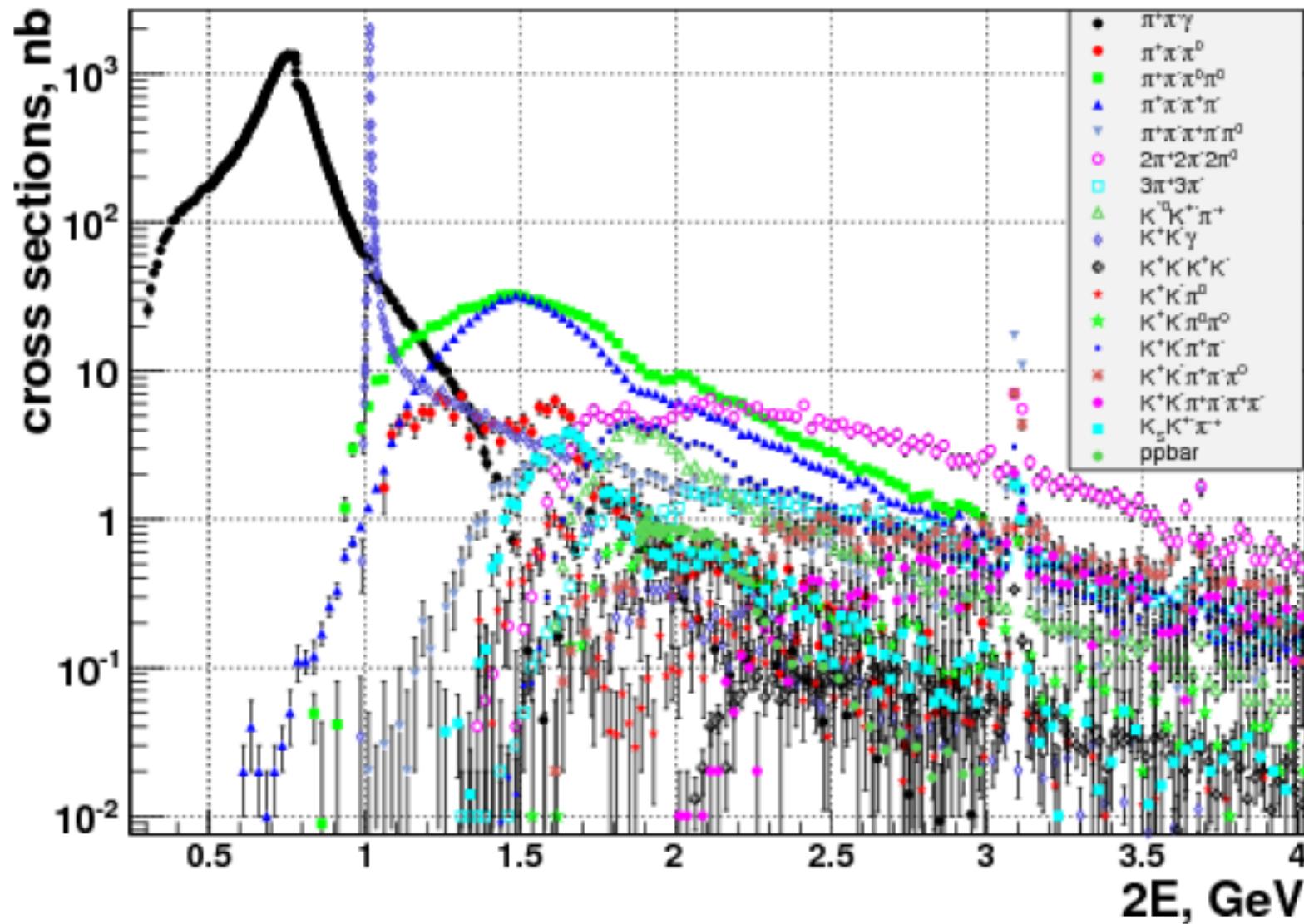
$a_\mu^{had, VP}$



$\delta a_\mu^{had, VP}$



M. Davier, A. Hoecker, B. Malaescu and Z. Zhang, Eur. Phys. J. C 71 1515 (2011)



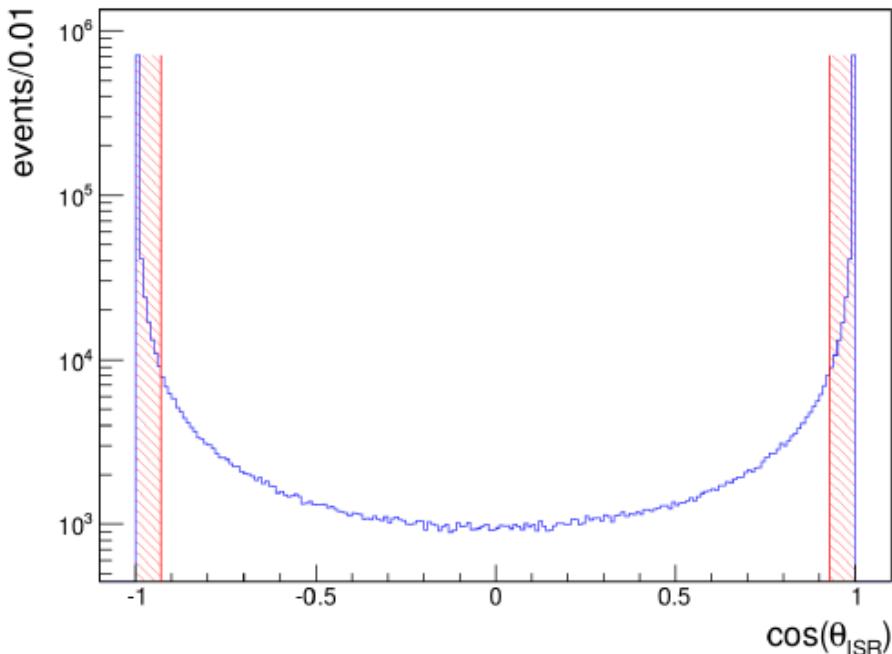
D. Bernard [BaBar Collaboration], PoS Hadron 2013, 126 (2013) [arXiv:1402.0618 [hep-ex]].



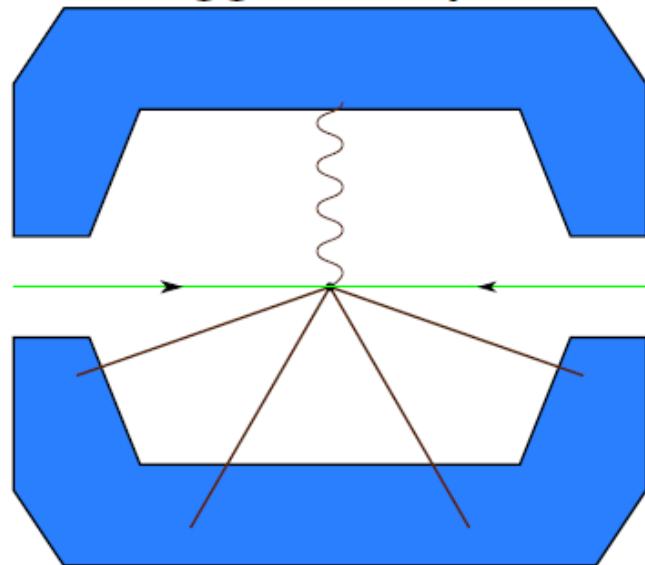
How to go to low s?

- Can tune beam energies in wide range (R-scans)
- Cannot go to threshold - particles need a minimum momentum to be detected
- Use initial state radiation (ISR) - lower s
- $e^+e^- \rightarrow e^+e^-\gamma \rightarrow X$
- Speciality of group of A. Denig

polar angle distribution of ISR photons (MC)

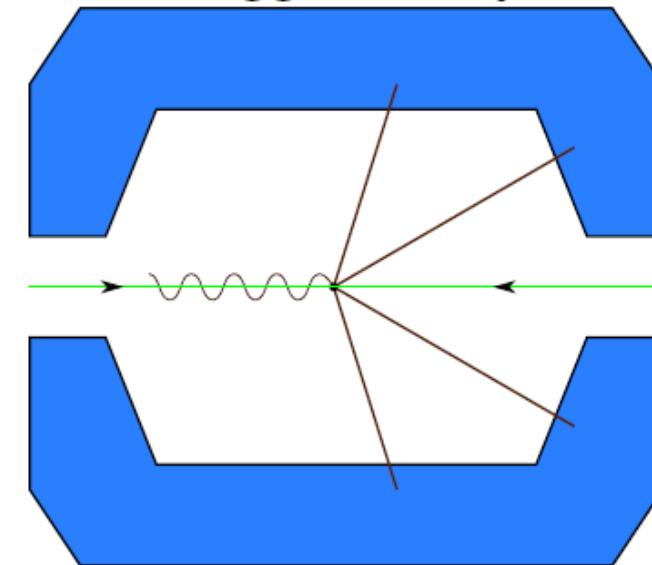


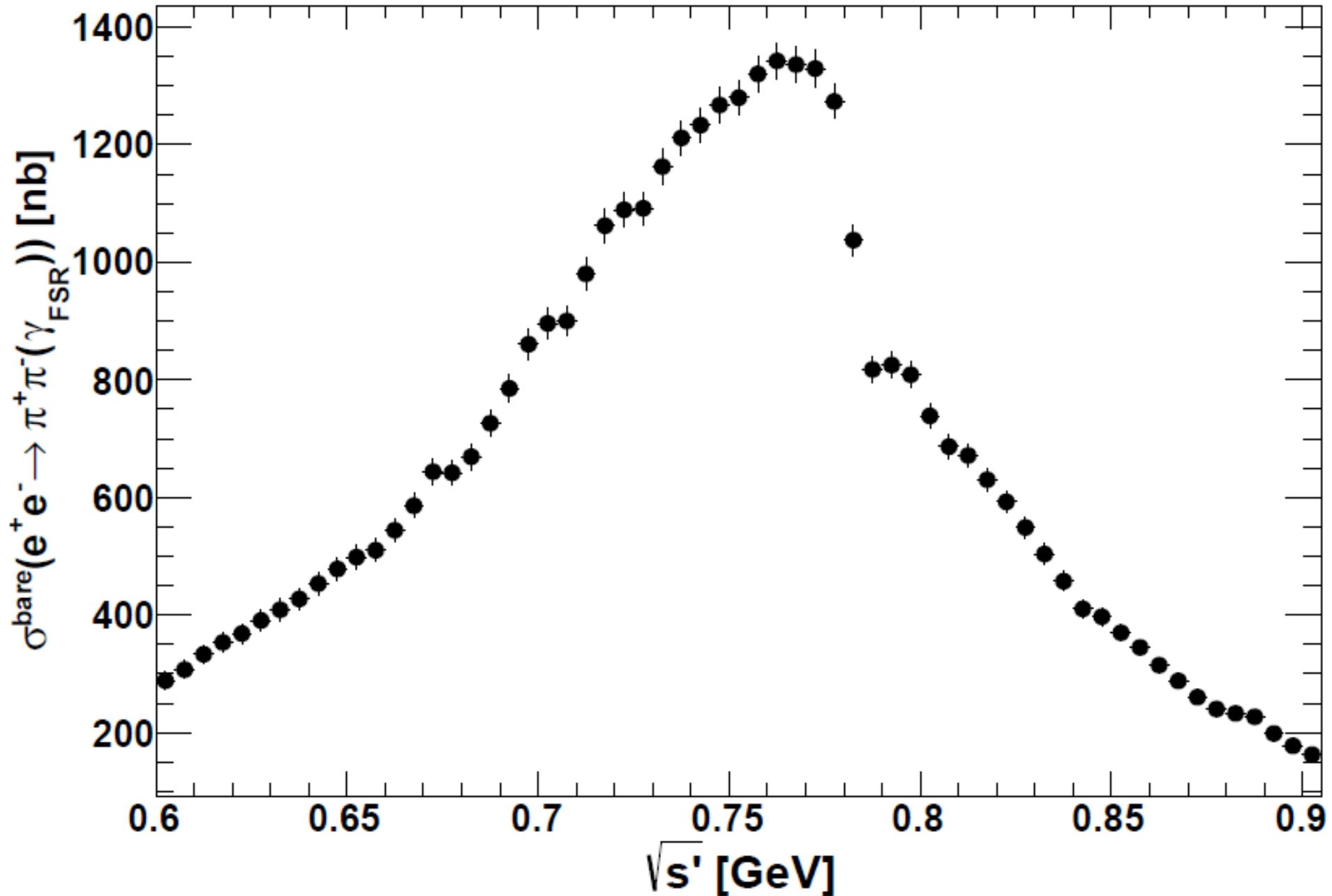
Tagged analysis

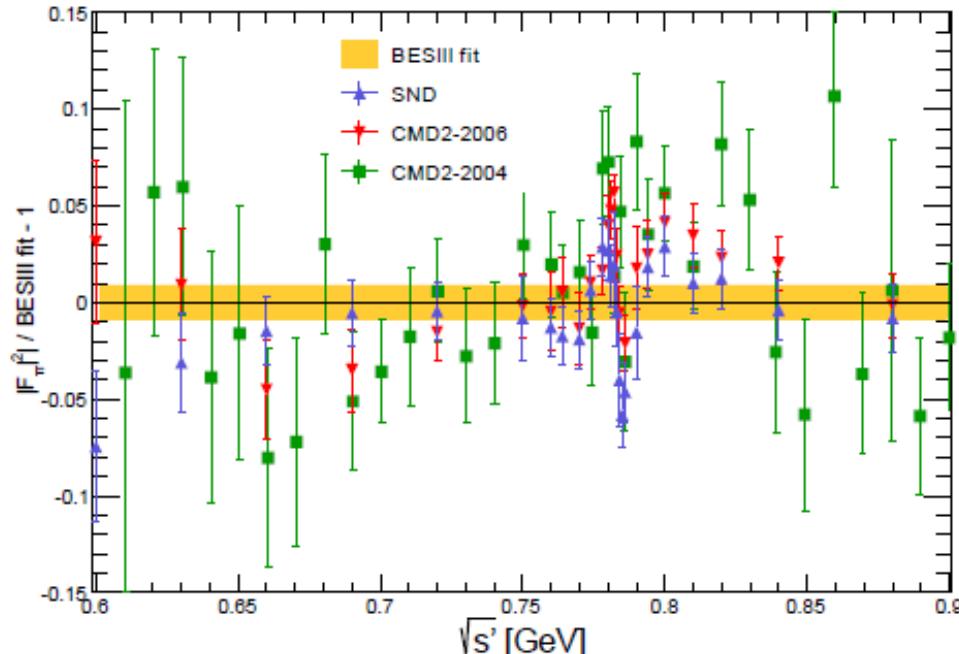
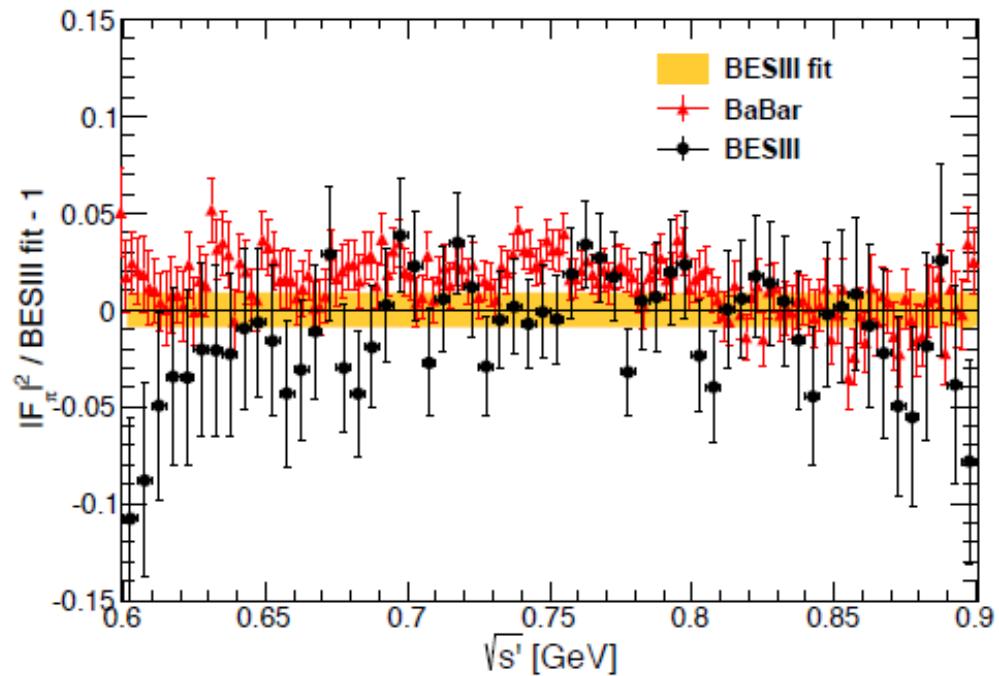
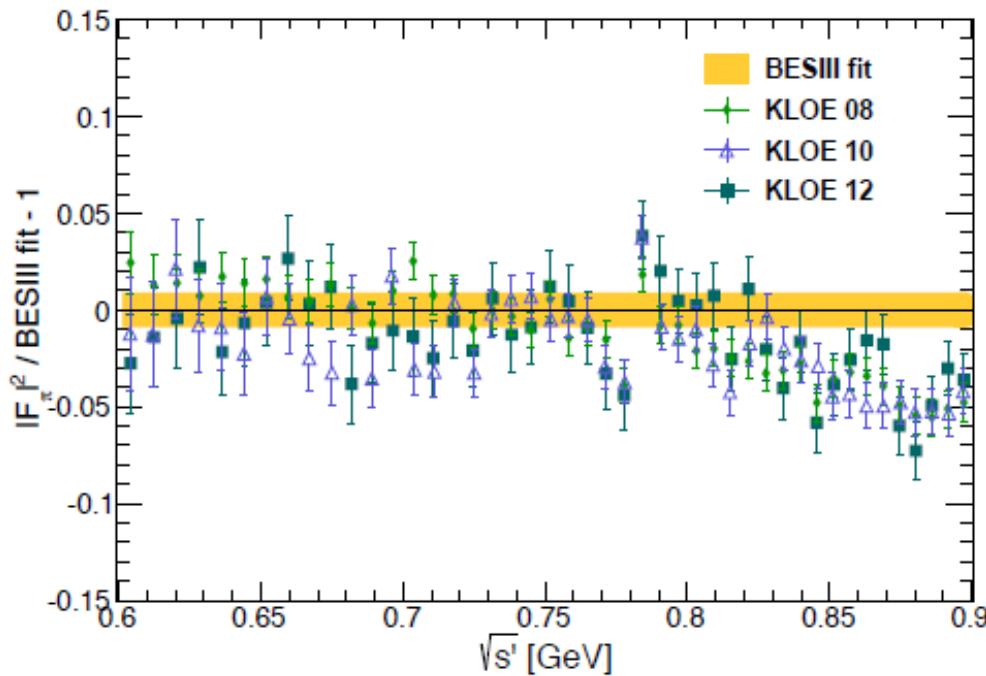


- Emission of ISR photons is suppressed by α/π
- High integrated luminosity needed for precision measurements
- Untagged analysis possible above $\approx 1 \text{ GeV}$

Untagged analysis







- New BESIII measurement agrees with KLOE and BaBar
- Small shift wrt. BaBar above $\rho\omega$ interference

Martin Ripka, KPH

