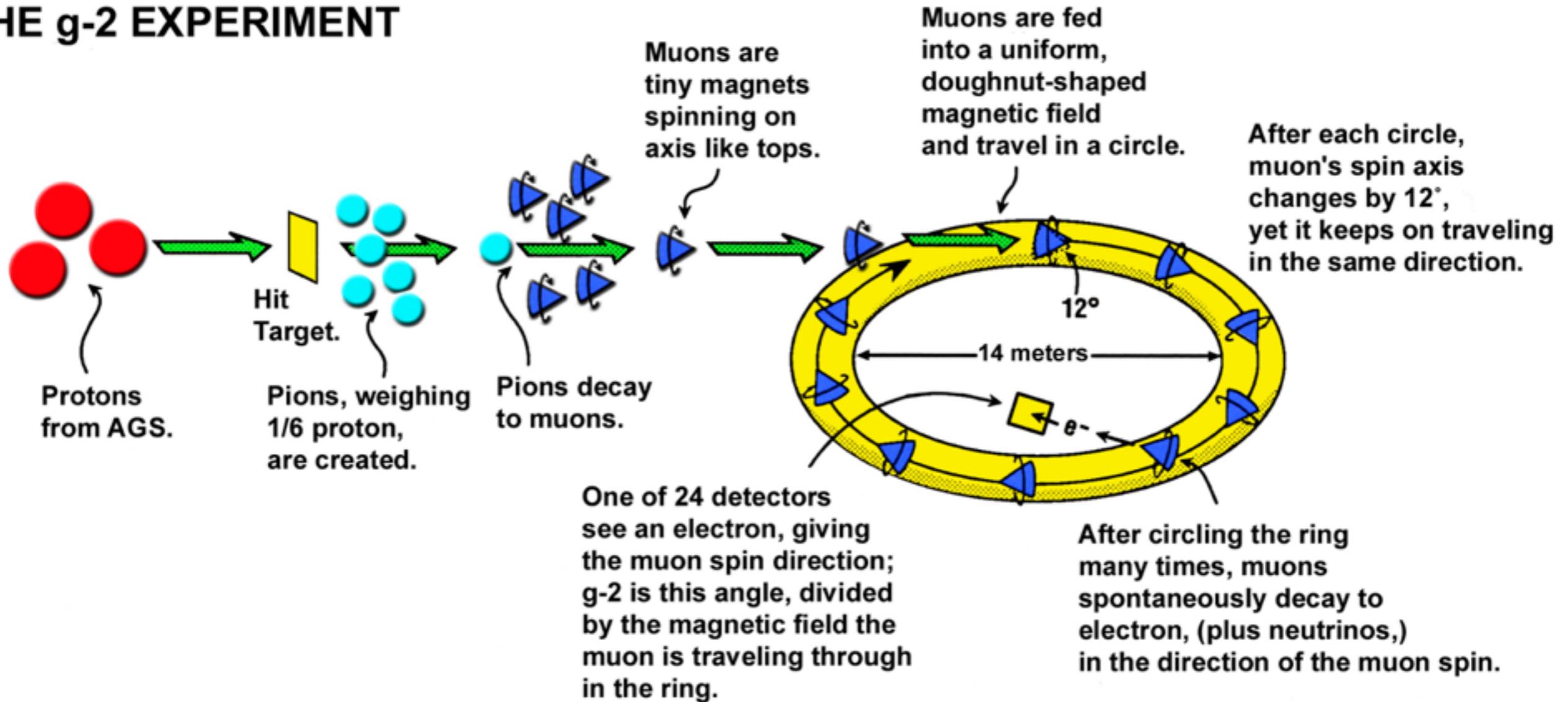
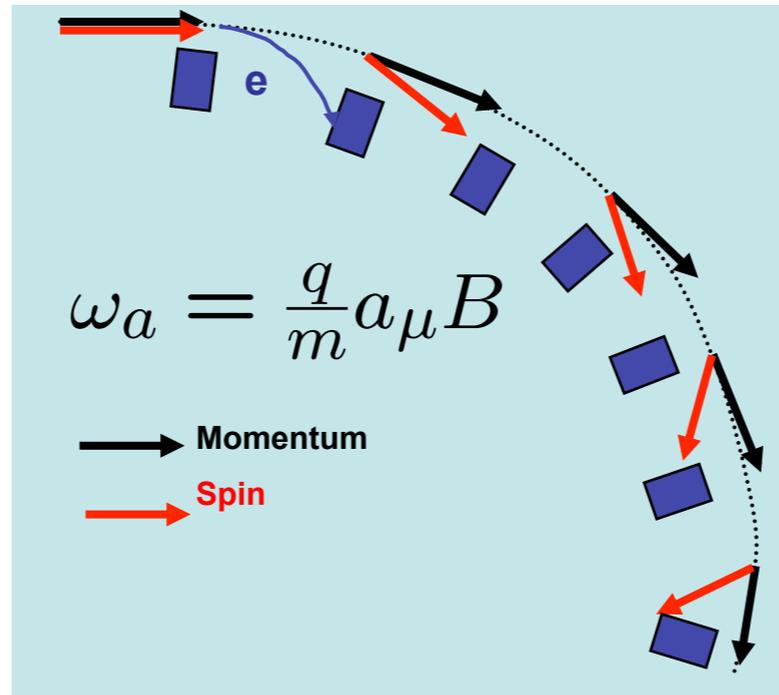


# LIFE OF A MUON: THE g-2 EXPERIMENT

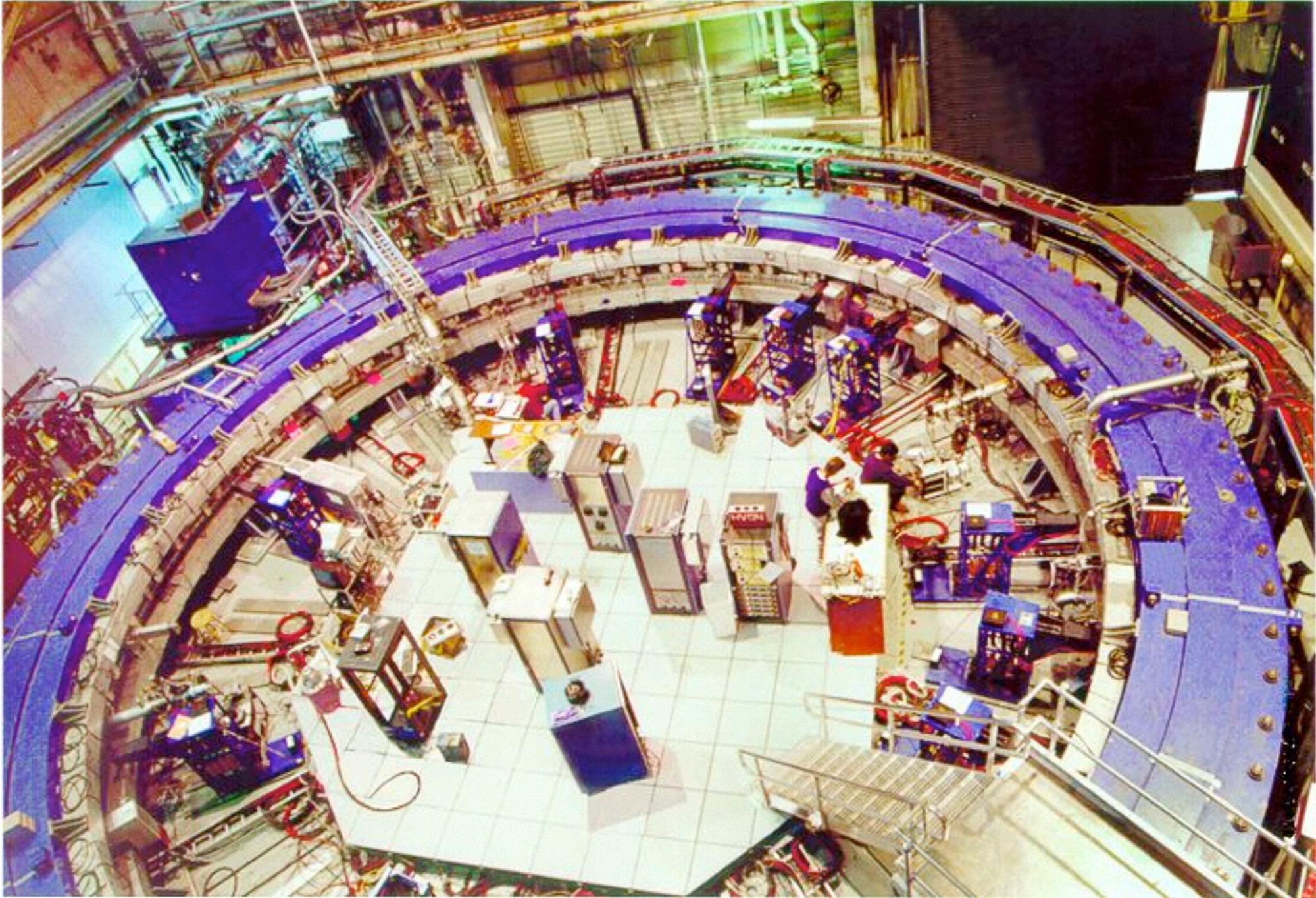


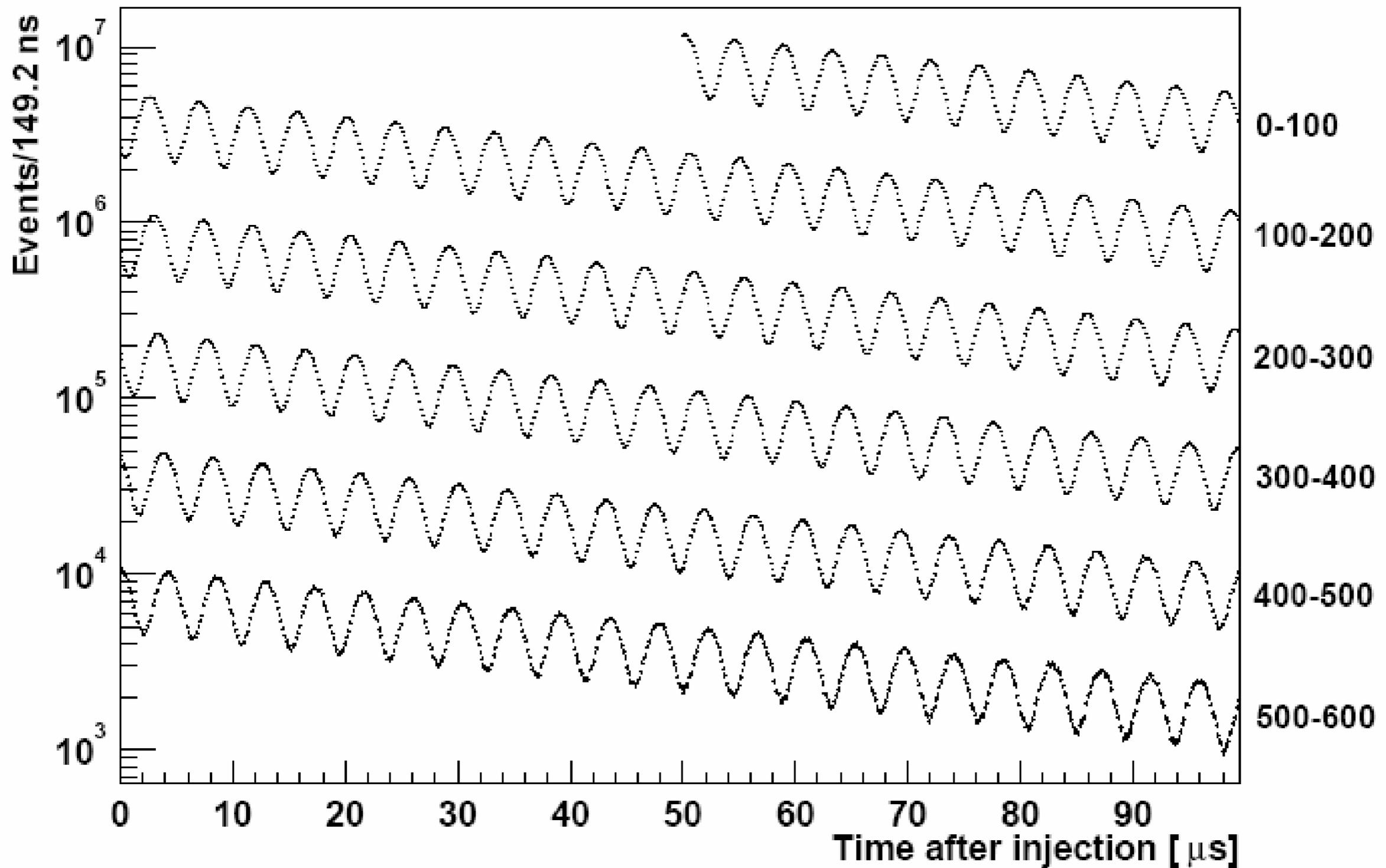
see <http://www.g-2.bnl.gov/>



$$\vec{\omega}_c = -\frac{q\vec{B}}{m\gamma}, \quad \vec{\omega}_s = -\frac{gq\vec{B}}{2m} - (1 - \gamma)\frac{q\vec{B}}{\gamma m}.$$

$$\vec{\omega}_a = \vec{\omega}_s - \vec{\omega}_c = -\left(\frac{g-2}{2}\right)\frac{q\vec{B}}{m} = -a_\mu\frac{q\vec{B}}{m}.$$



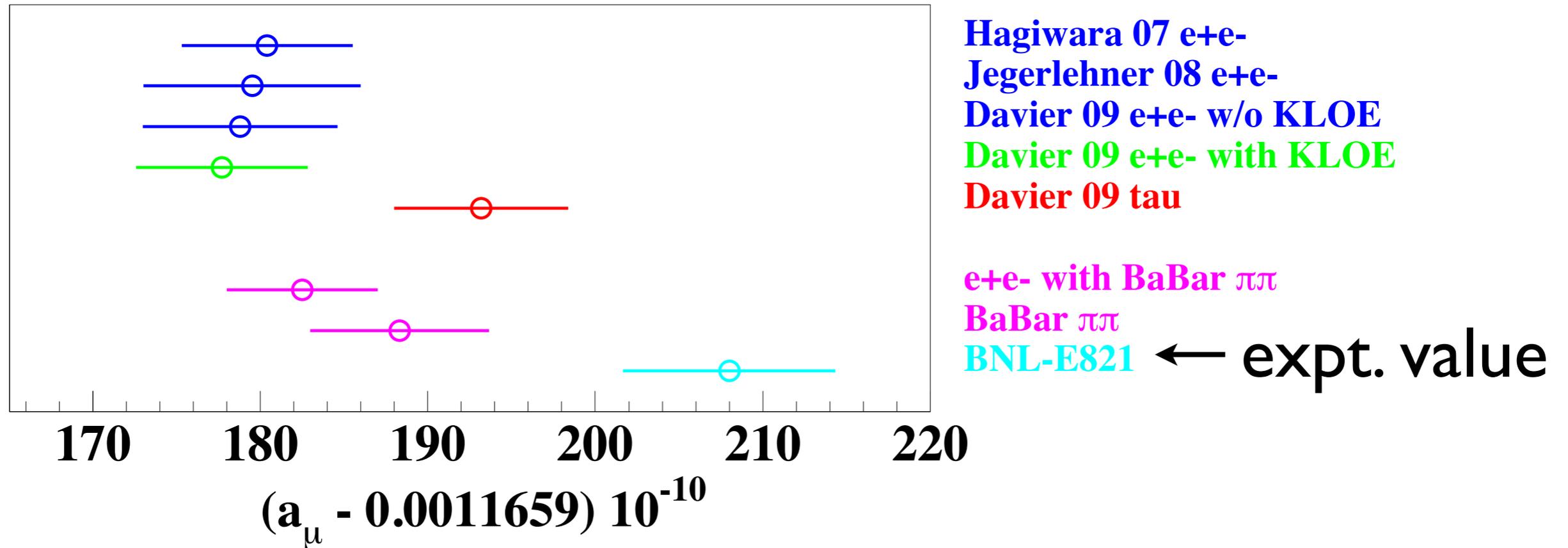


$$N(t) = N_0 e^{-t/\tau} [1 + A \cos(\omega_a t + \phi_0)]$$

# Result

QED	116 584 71.81	$\pm 0.02$
Leading hadronic VP	690.30	$\pm 5.26$
Sub-leading hadronic VP	-10.03	$\pm 0.11$
Hadronic light-by-light	11.60	$\pm 3.90$
Weak (incl. 2-loops)	15.32	$\pm 0.18$
Theory	11659179.00	$\pm 6.46$
Experiment [4]	11659208.00	$\pm 6.30$
Exp – theory	29.00	$\pm 9.03$

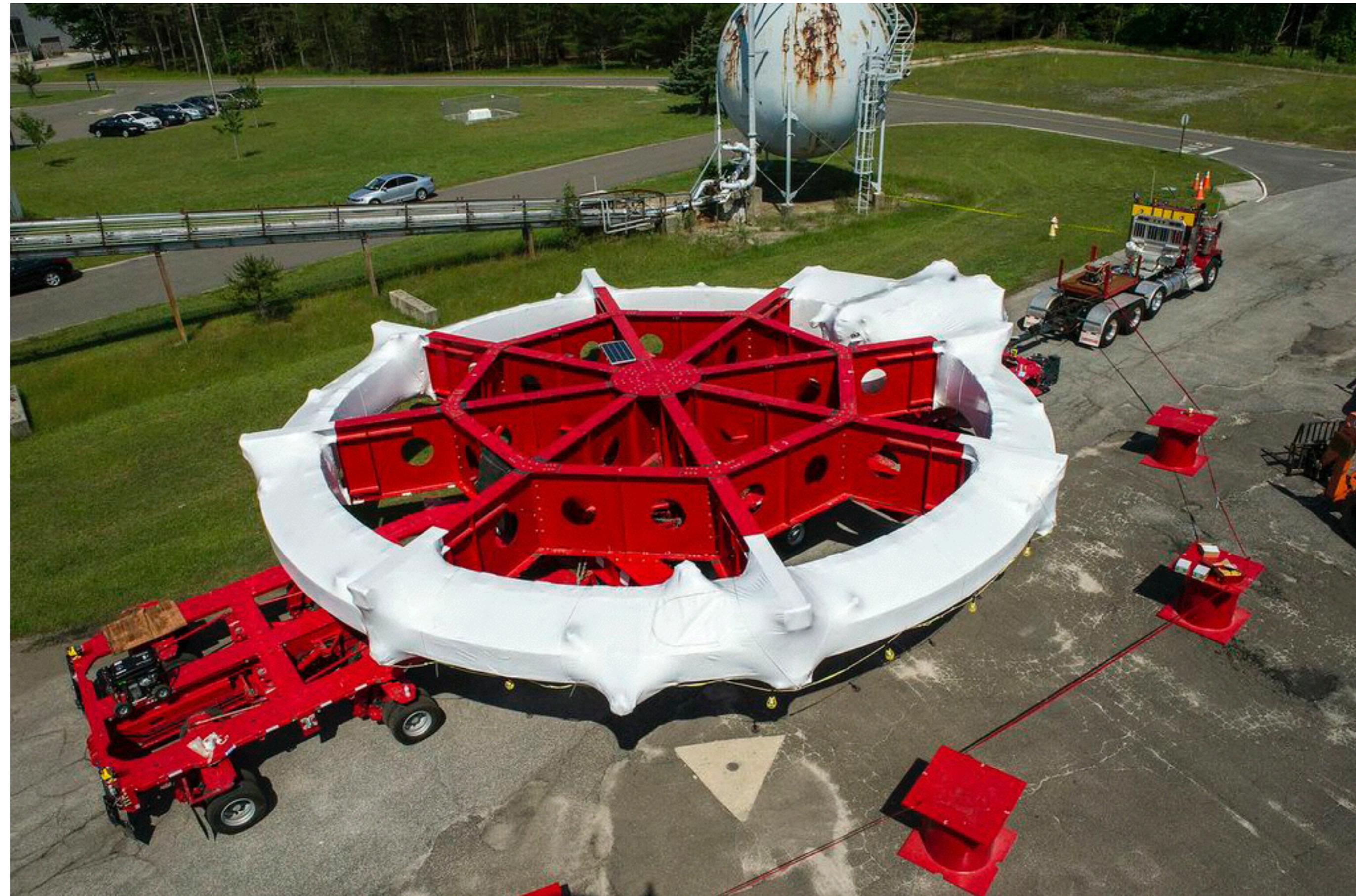
# Hadronic corrections



- Traditionally, extracting hadronic corrections from  $e^+e^-$  gave  $\sim 3.5\sigma$  deviation, while  $\tau$  results gave  $\sim 2\sigma$ .
- Extraction from  $\tau$  relies on (approximate) isospin symmetry.







# Schedule

- The “big move” took place in 2013.
- In the meantime, the experiment has been installed at Fermilab.
- Data taking should start 2017.