Beate Naroska
1943 - 2008

# Stations in Beate's professional life

- 1968 – 1971 Physics studies
  in Göttingen and Hamburg.
  PhD at DESY on photoproduction off nuclei and protons.

- 1971 – 1978 CERN, work at the ISR in Carlo Rubbia's group on diffractive processes.
  R&D for multi wire proportional chambers with two dimensional read out.

- 1978 return to DESY
  to join the JADE collaboration.
  Research topic: electro weak phenomena.
  Responsible for the TOF system.

- 1989 professor of physics at the University of
  Hamburg, continue research at DESY.
  At HERA she joined the H1 collaboration.
  Research on heavy flavor production and
  diffractive processes.

- 2000 sabbatical semester at CERN:
  work on HARP to provide precise data on
  particle production relevant to neutrino physics
  (the Hamburg University is a member of OPERA
  using the CGNS beam at Gran Sasso).

- Beate served on many committees like the
  DESY Scientific Council, Federal funding
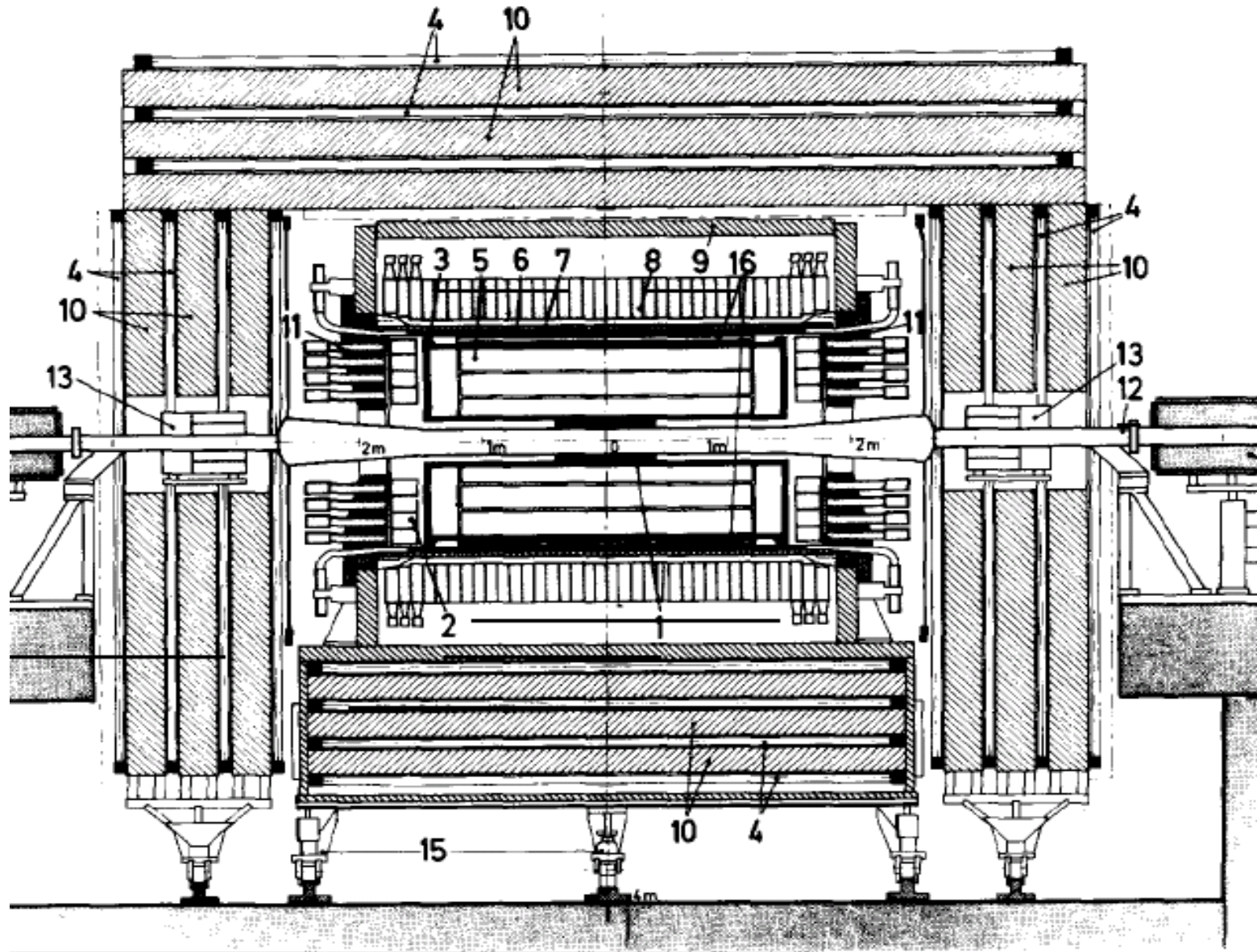 committee, Alexander von Humbold Selection
  Committee.

Electroweak processes at JADE

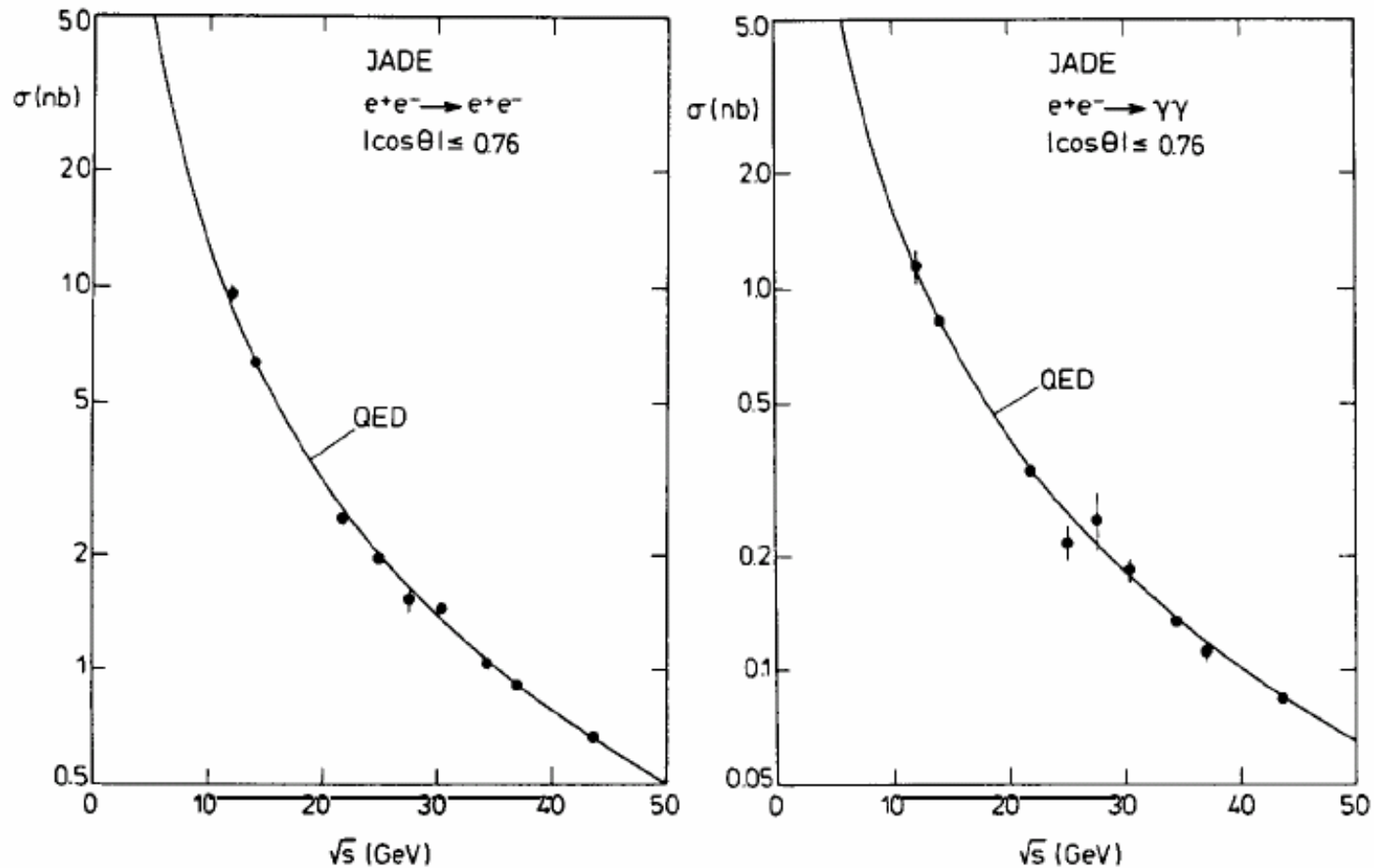- Test the γ – Z interference in lepton pair production $e^+ e^- \rightarrow \mu^+ \mu^- / \tau^+ \tau^-$
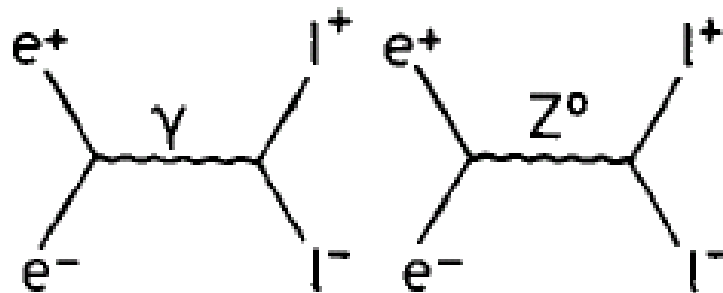
$$\frac{d\sigma}{d\Omega} = \frac{\alpha^2}{4s}\left(C_1\left(1 + \cos^2\theta\right) + C_2\cos\theta\right)$$
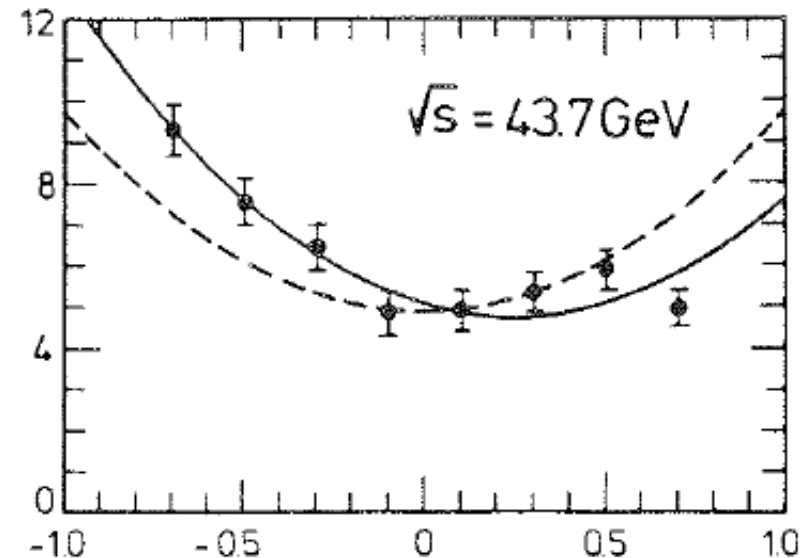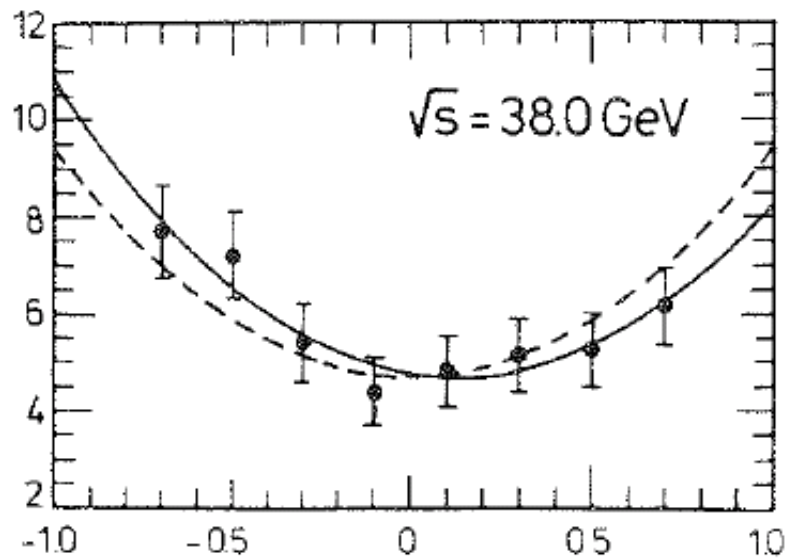
JADE Detector

QED tests

QED is valid at distances of the order of 10^{-16} cm

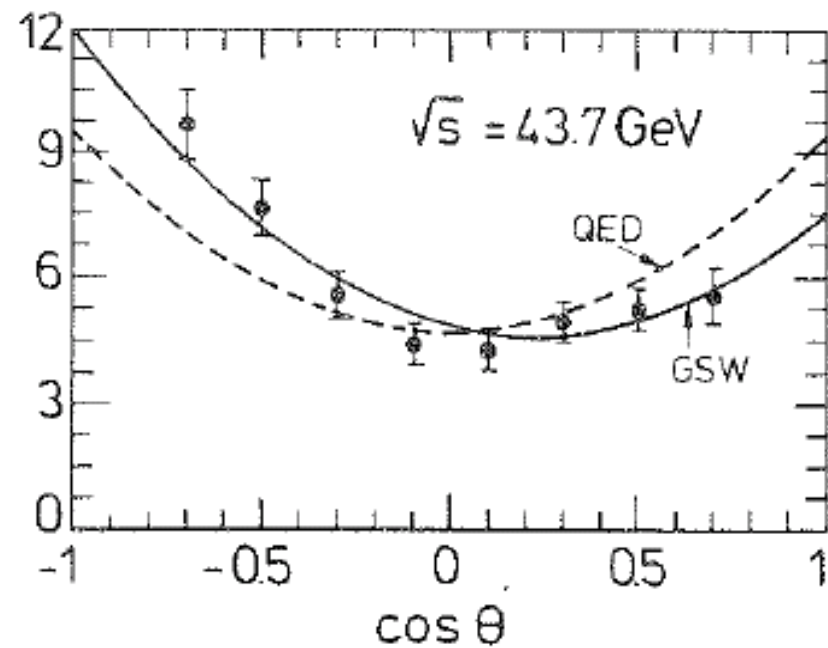# Charge asymmetry for μ pairs
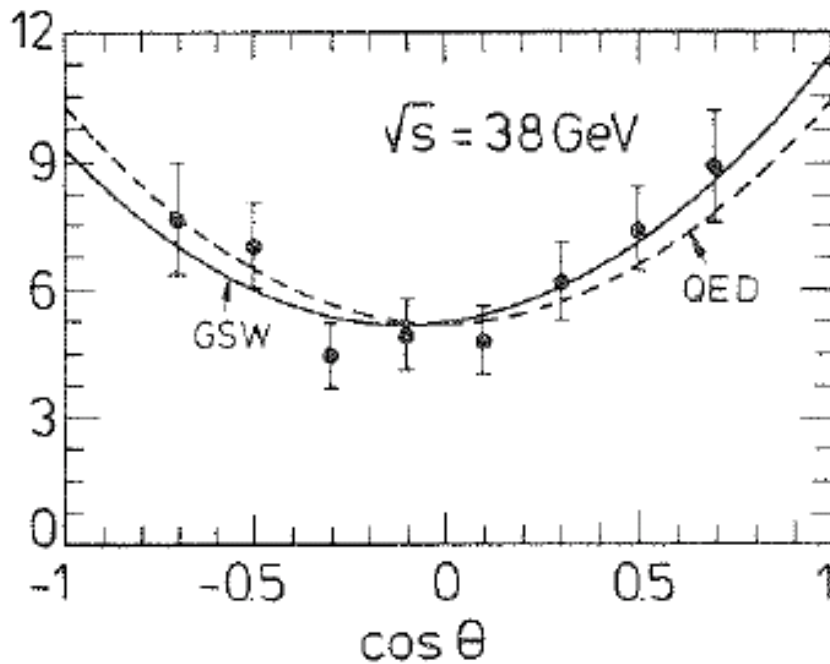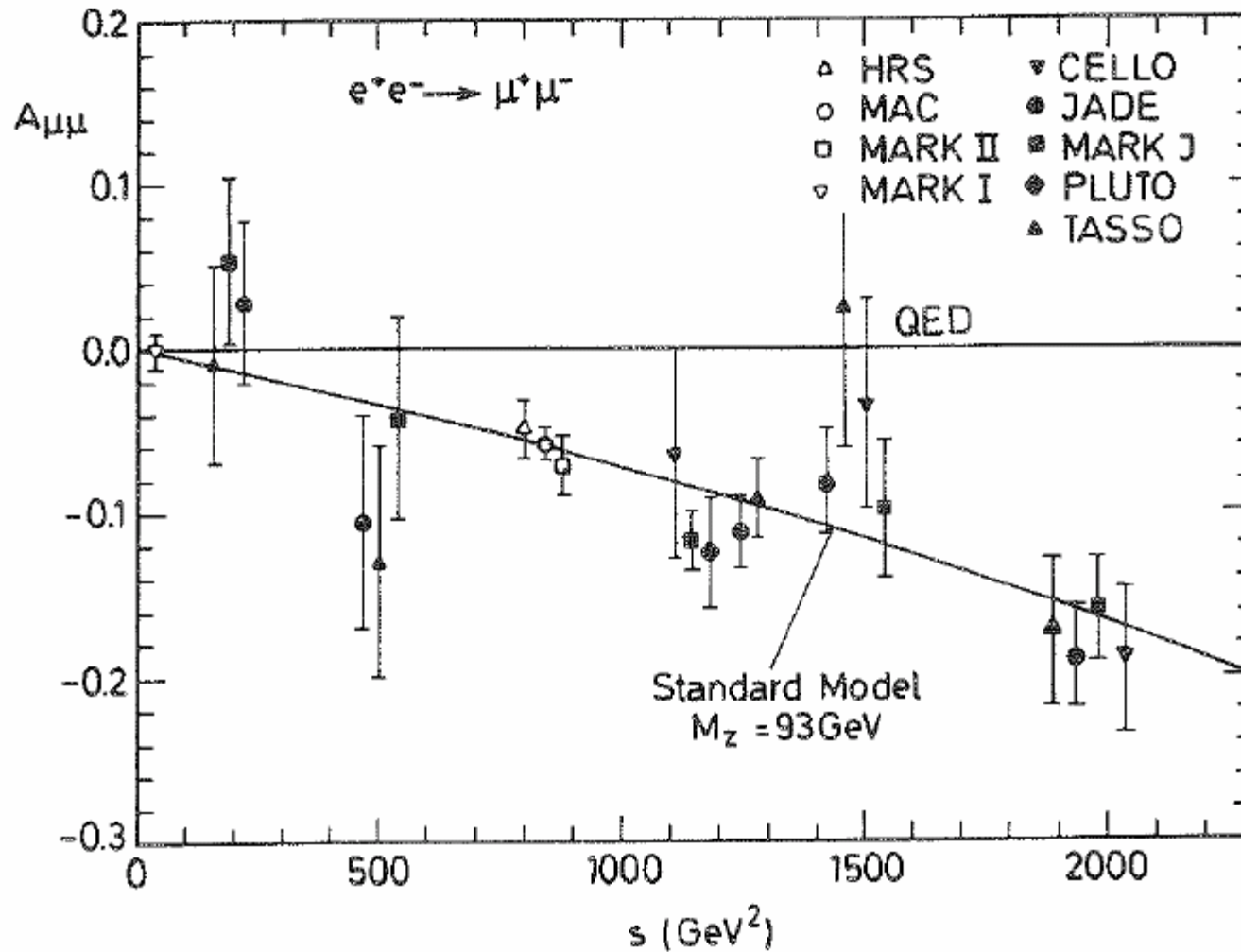
$$e^+ \ e^- \ \rightarrow \ \mu^+ \ \mu^-$$

Interference between γ and Z exchange

Charge asymmetry for τ pairs

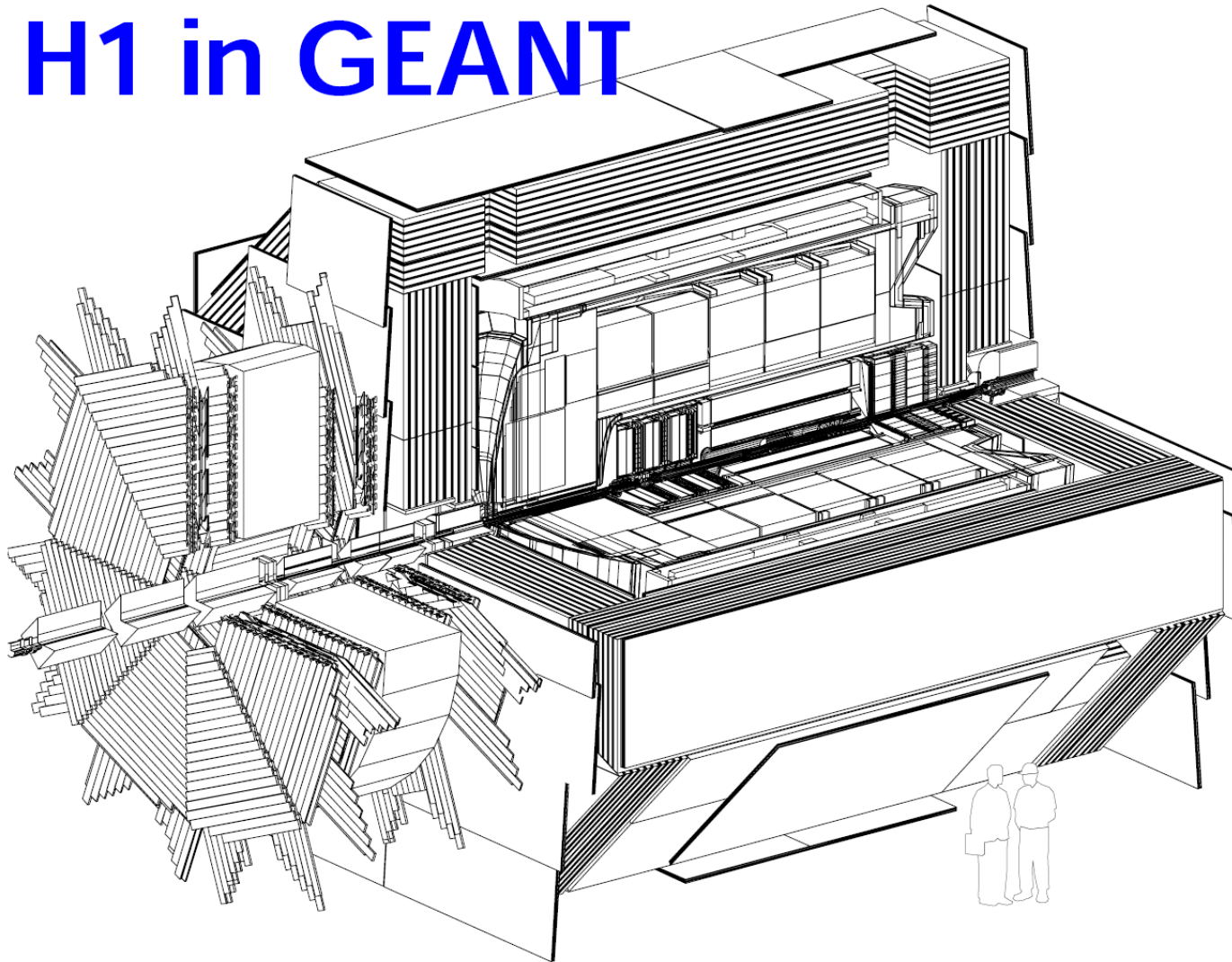$$e^+ \; e^- \; \to \; \tau^+ \; \tau^-$$
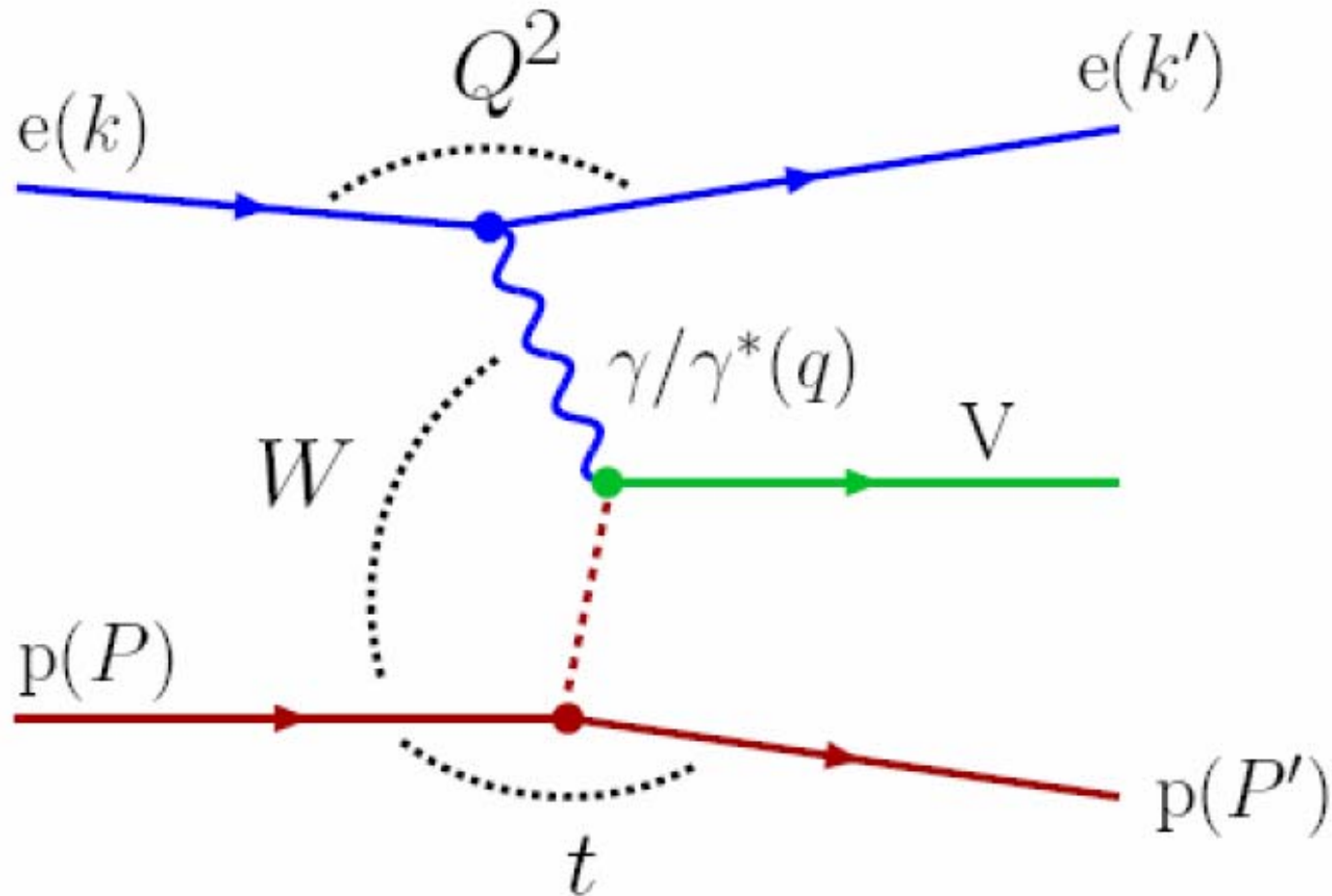
Charge asymmetry for μ pairs

Photoproduction of vector mesons at HERA

- Back to the roots after 30 years, photoproduction and diffractive processes

- Low mass vector mesons:
  e.g. ρ VDM and pomeron exchange.

- Heavy vector mesons:
  e.g. J/Ψ perturbative QCD process,
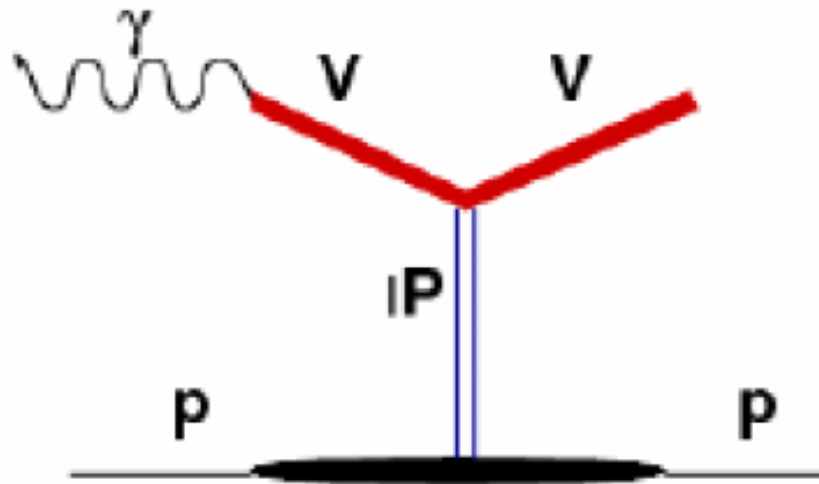 hard scale set by the meson mass.

H1 in GEANT
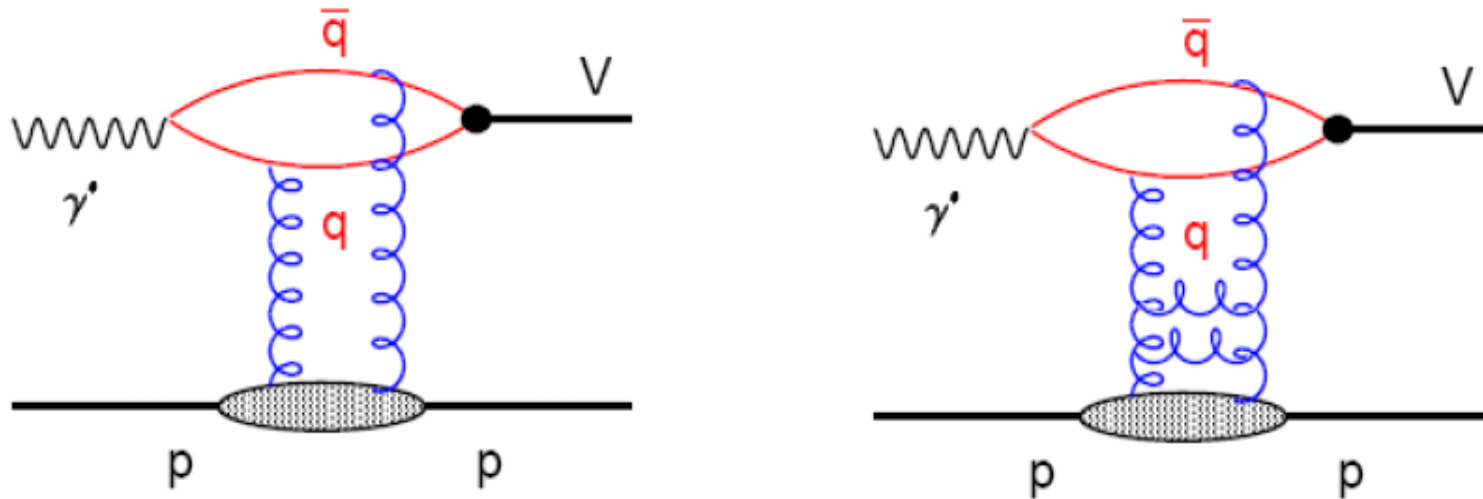
Vectormeson production at HERA

Soft production

$$\frac{d\sigma(\gamma p \to V p)}{dt} \propto e^{-b_0|t|} \left(W^2 / W_0{}^2 \right)^{2(\alpha(t)-1)}$$

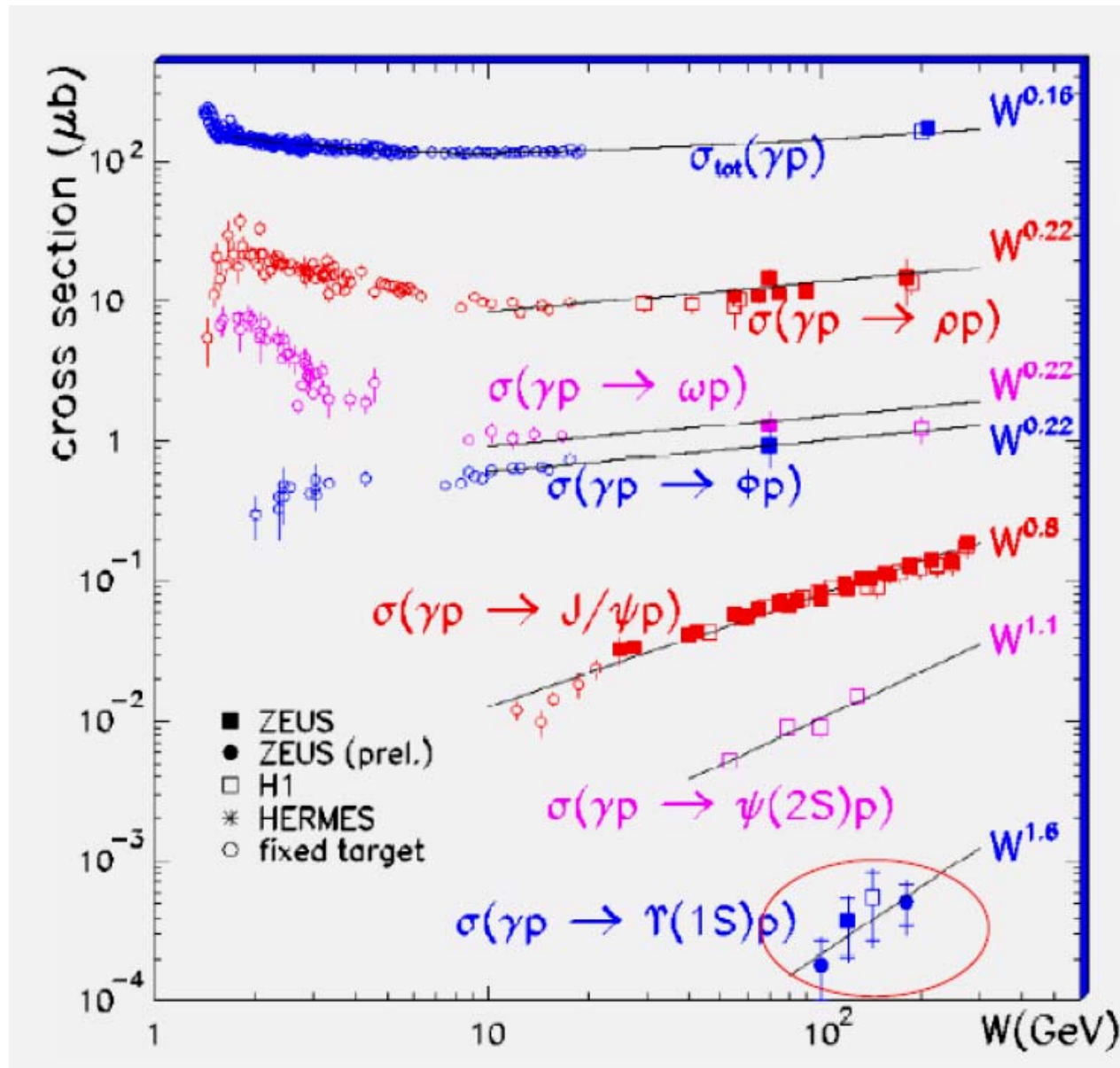$$\alpha(t) = \alpha(0) + \alpha' t = 1.08 + 0.25 t$$
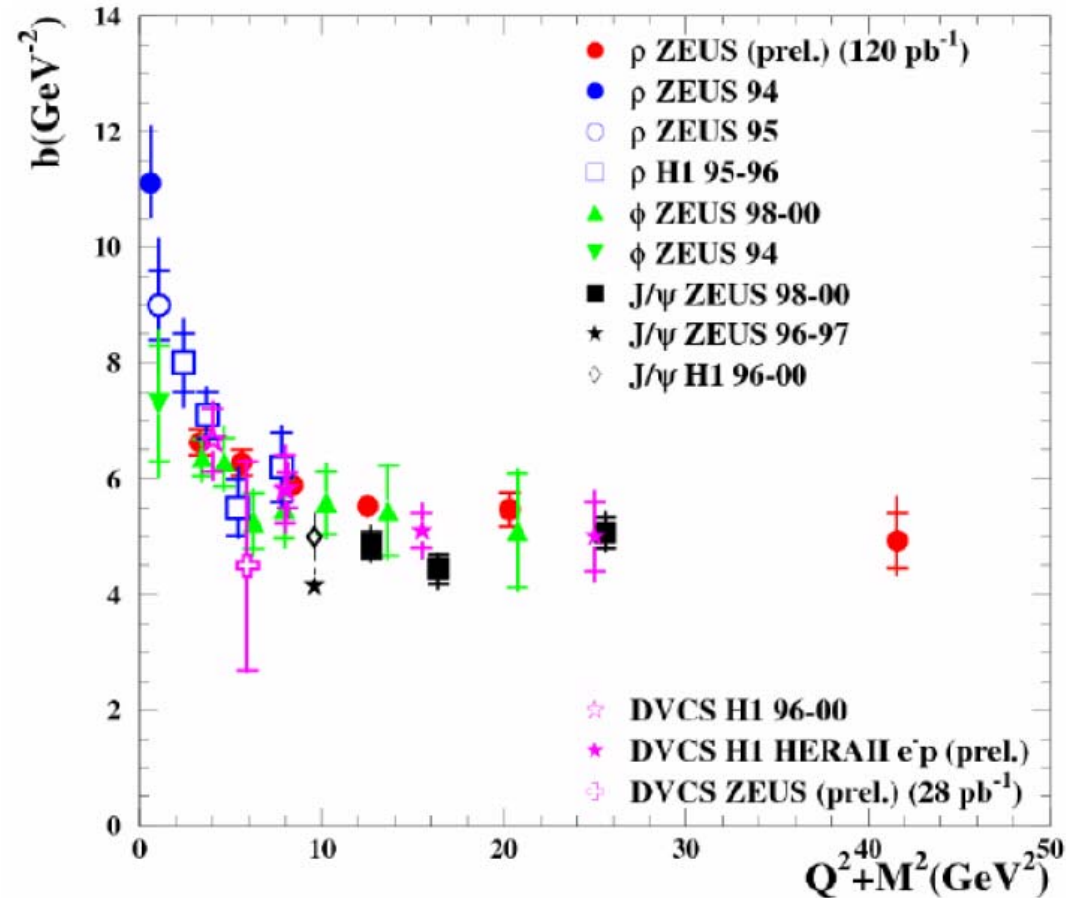
Hard production (QCD)

$$\sigma(W) \propto \left[\alpha_s(\mu^2)\bar{x}g(\bar{x},\mu^2)\right]^2 \quad \mu\text{ - hard scale}$$

$$\bar{x} \propto \frac{Q^2 + M_V^2}{W_{\gamma p}}$$

Photoproduction of Vector Mesons

Hard scale dependence

Soft production dominates for light vectormesons
Hard production dominates for heavy vectormesons

Beate

- She loved physics and devoted her scientific live to particle physics.

- She was a gifted teacher an enthusiastic mentor for a large number of students.

- Her advise was highly appreciated.

- She loved the fresh air of the sea and the mountains.

- She loved classical music and ballet.

Beate,
we will miss you