$\vec{P}$olarization Update

U. Wienands, SLAC

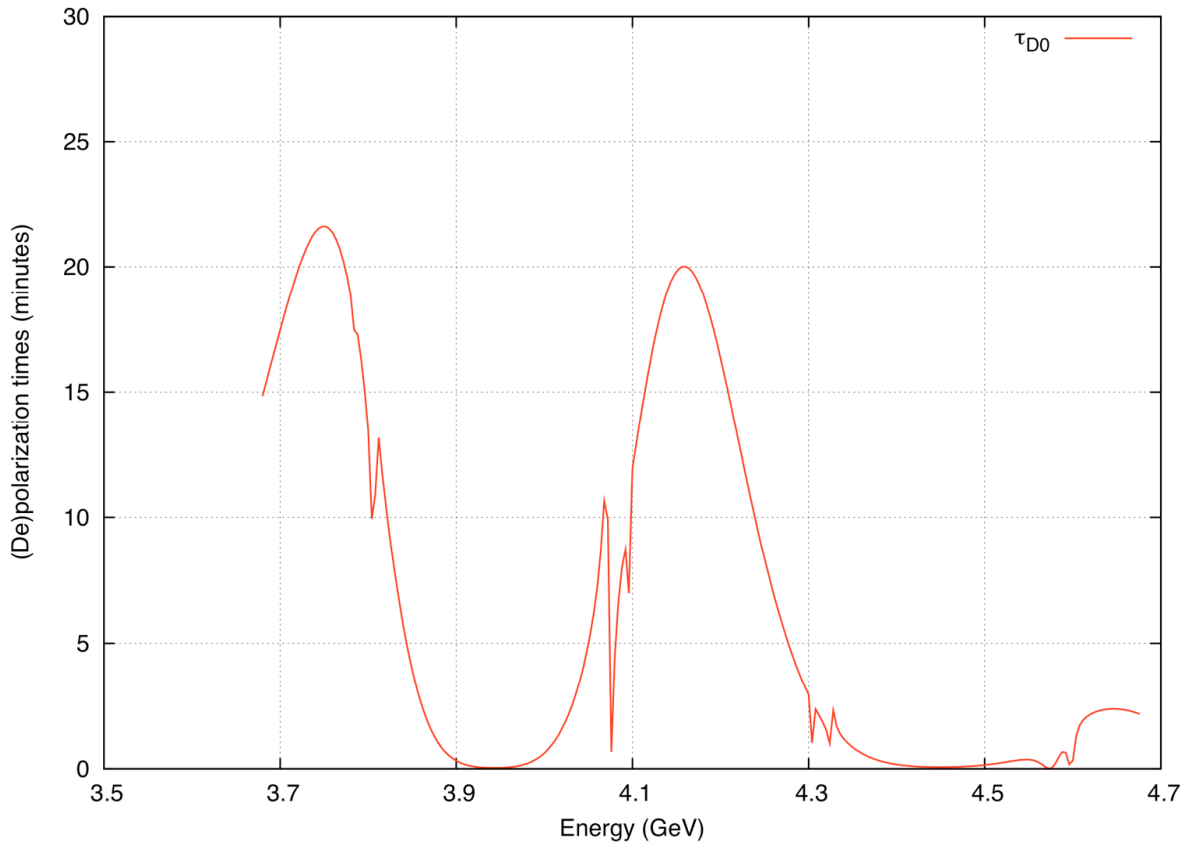
D.P. Barber, DESY

Status

- CDR2 section written
  - based on July-09 lattice
  - solenoid rotators, symmetric
  - continuous injection at 90% polarization
  - 3.5 min. beam lifetime at high luminosity.
  - some modelling of orbit excursions
    - compatible with emittance requirement: 50…100 μm alignment
  - >> could get 75…80% polarization <<

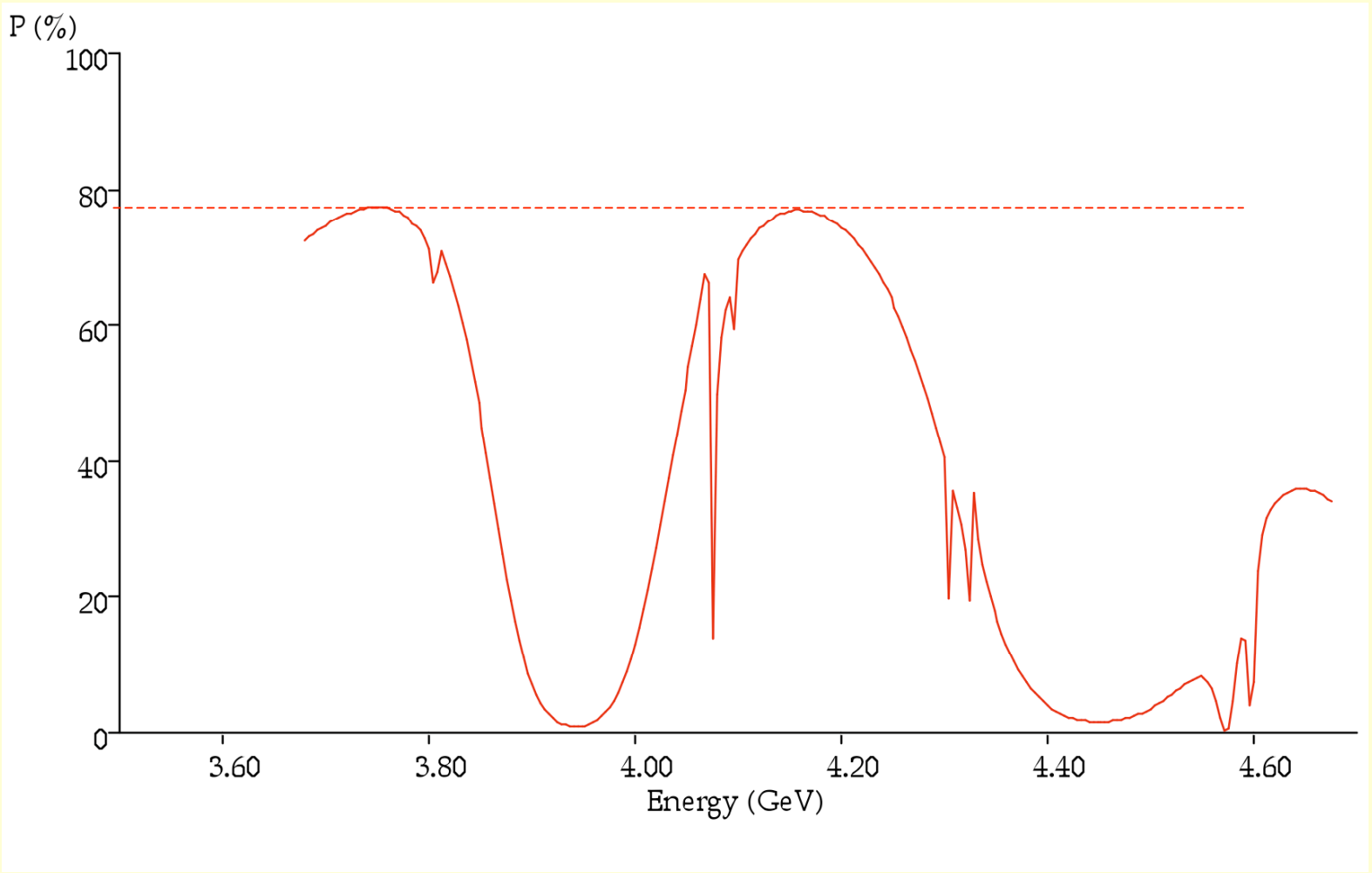
Diffusion Time

Jly-09 lattice, SLICK



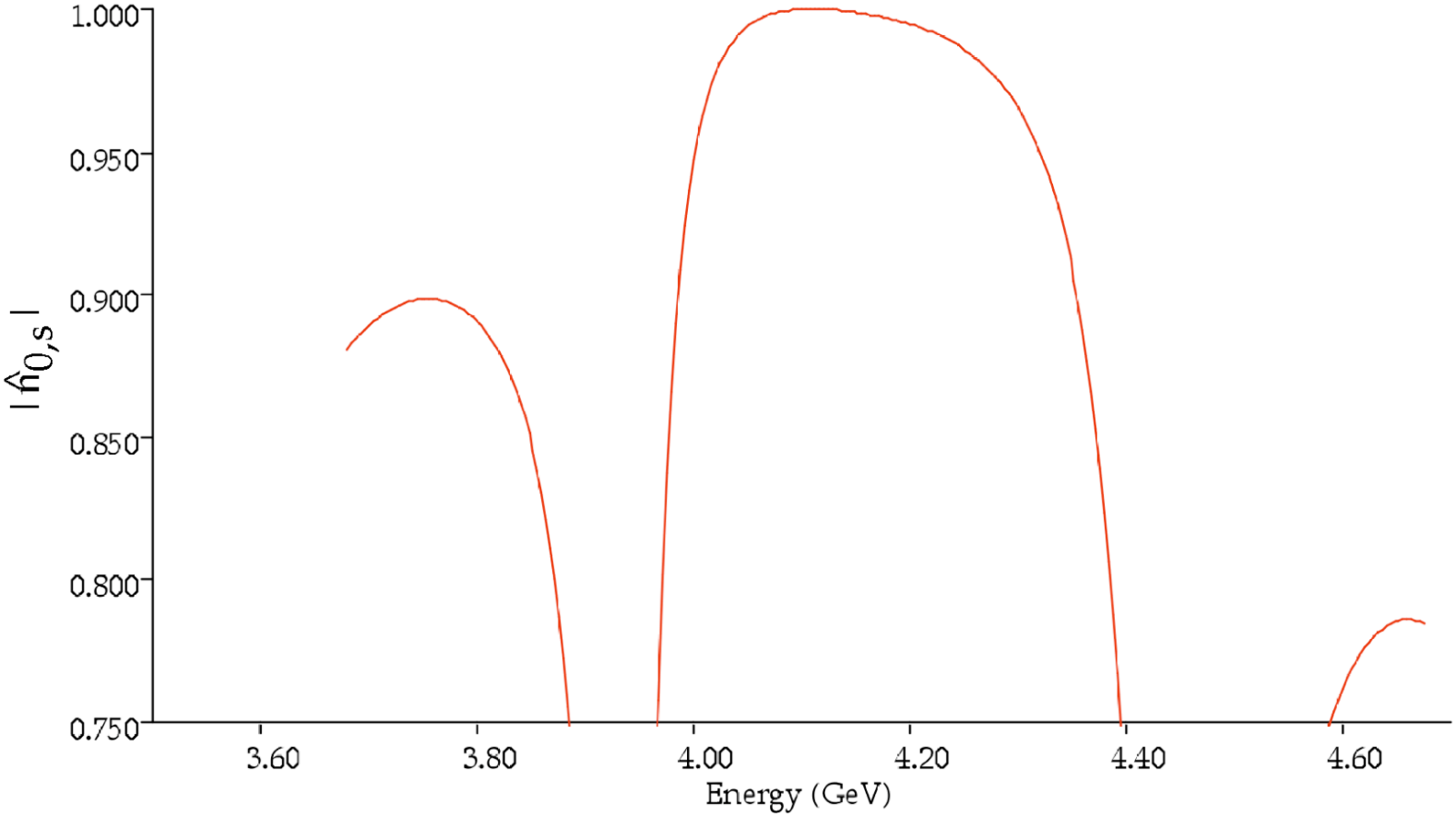
Polarization (P_{inj} = 90%)

Jly-09 lattice, SLICK



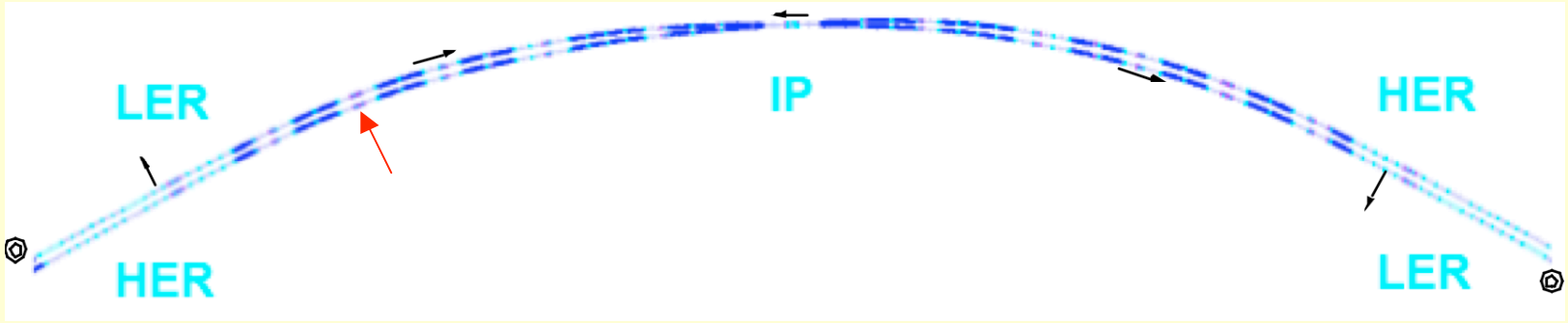
Longitudinal Component of *P*

Jly-09 lattice, SLICK



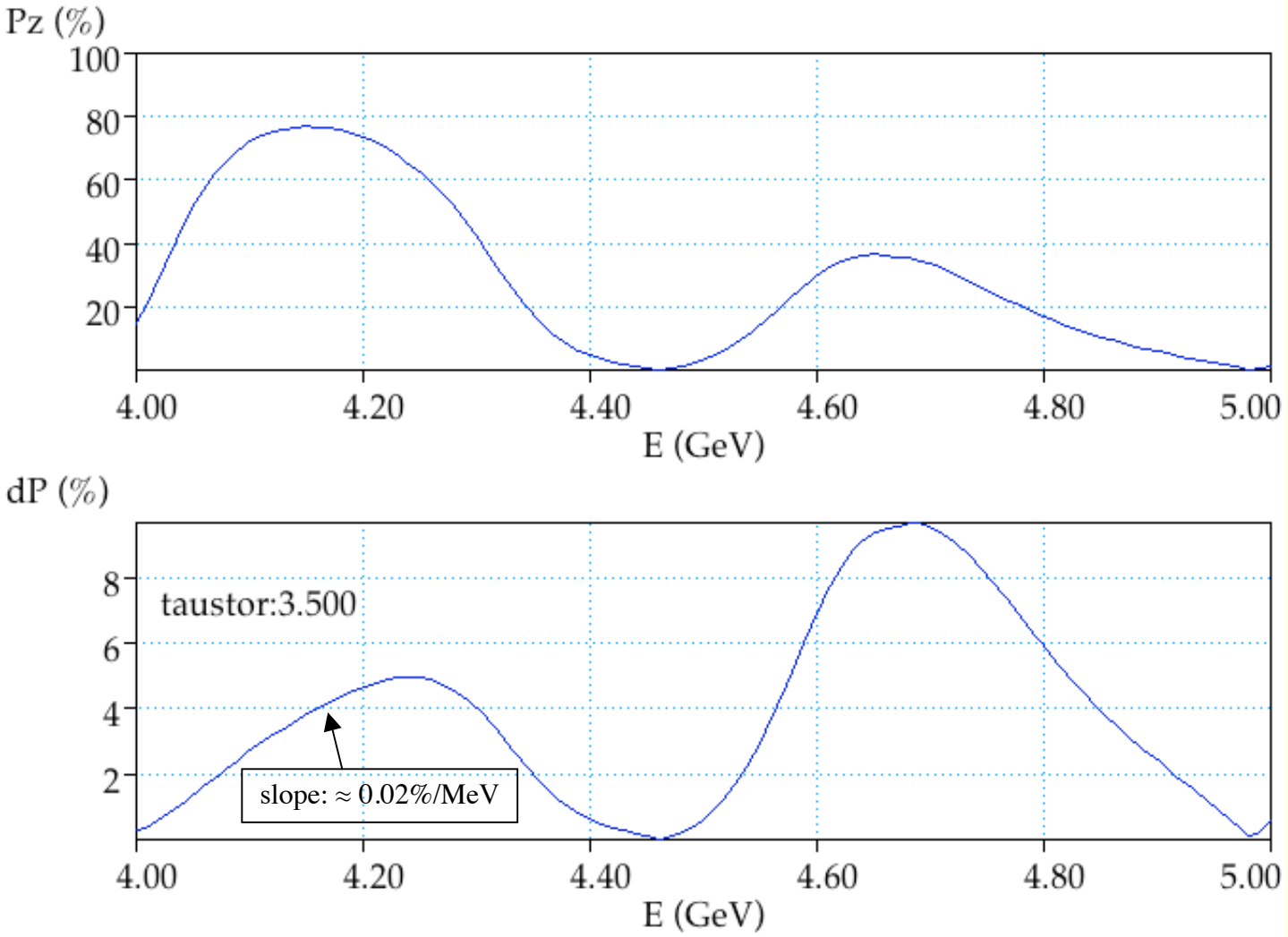
Compton IP

Jly-09 lattice



Compton IP vs Detector IP

Jly-09 lattice

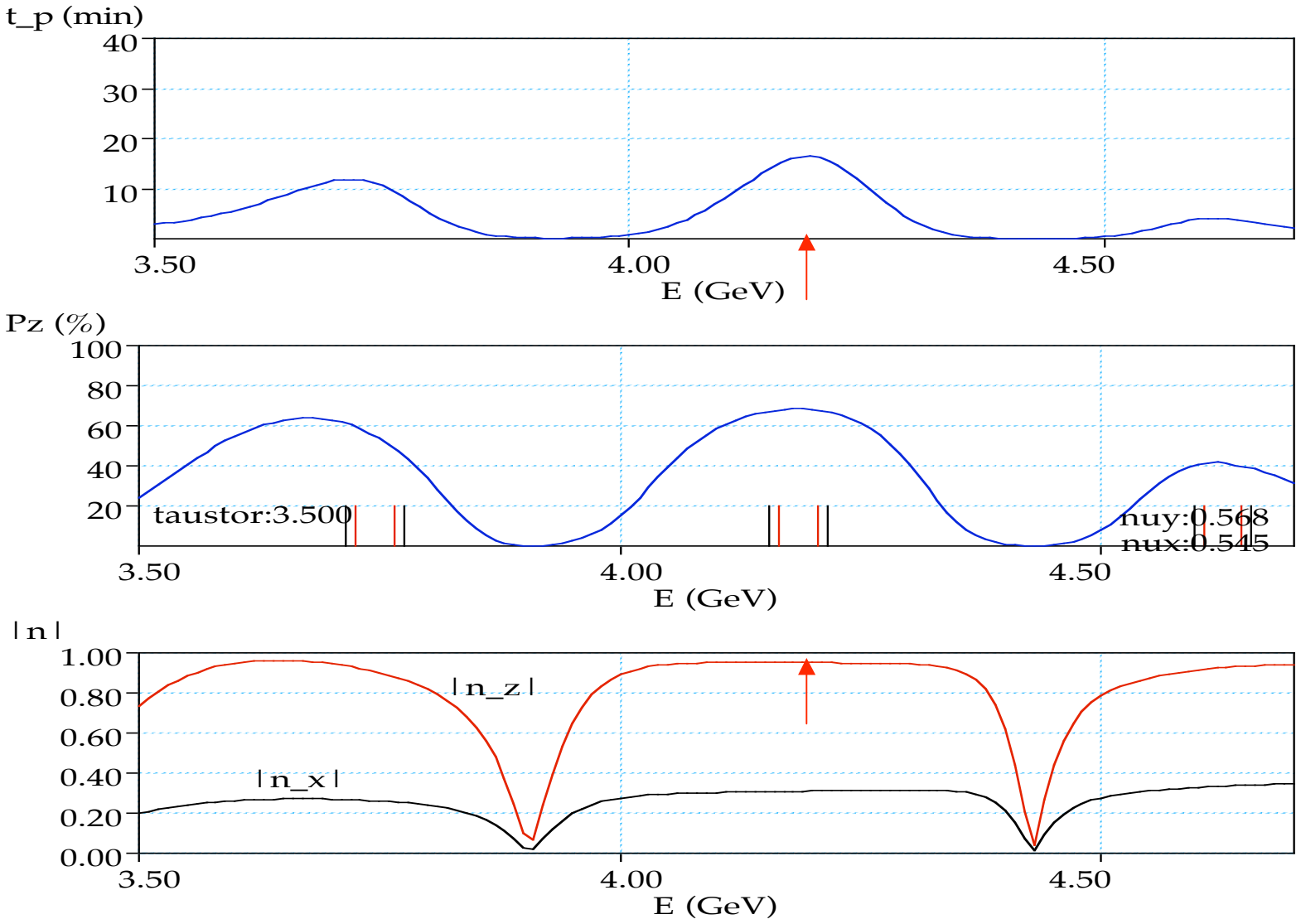


New Lattices

- The LER lattice has somewhat shorter dipoles
  - ρ = 26.815 m (now), was 28.473 m
  - > time scale changes by $(\rho_{new}/\rho_{old})^2 * C_{new}/C_{old}$, which is 0.85.
  - but effect on equilib. polarization should be small.
    - beam lifetime (3.5 min.) still dominates.
  - …to be confirmed by new SLICK runs.
- Note that the new lattice appears to have a shift in dipole angle in the S.R dipoles.
  - IP not "in the middle" by bending angle.
    - This causes horiz. component @ IP (n_0 not ∥ s)
    - Overall spin rotation not 180° @ 4.18 GeV=> possibly extra depolarization
  - Fix should be easy…

Hot off the Press…

Feb-10 lattice, n_0 code



To Do Items

- Make sure Ken & I are consistent w.r.t. Compton IP location.
  - will change for the new lattice
- Need to analyze latest lattice
  - fix deviations of bending angles in s.r.
  - verify new depolarization time & equilibrium polarization.
  - verify exact energy choice.
- Work with Grenoble group to integrate efforts.