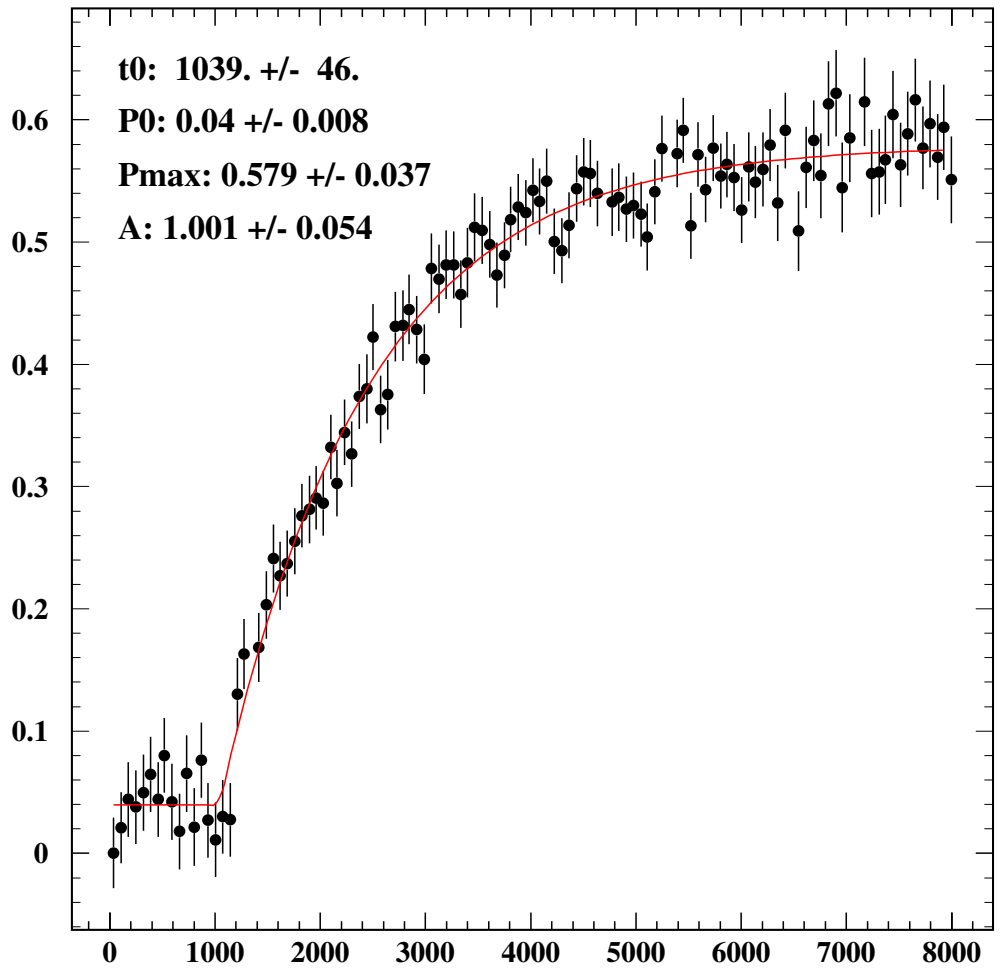
Risetime calibration of the TPOL

- Risetime measurements
- Proposal: TPOL calibration

Risetime measurements



Example: measurement from 1997

Sokolov-Ternov: $P_{ST} = 92.4\%$ and $\tau_{ST} = 40\,\text{min}$

Spin-diffusion: $P_{\text{max}} = f_P \times P_{ST}$ and $\tau_{\text{max}} = f_\tau \times \tau_{ST}$

where $f_P = f_\tau = \frac{\tau_{\text{dep}}}{\tau_{\text{dep}} + \tau_{ST}}$

Risetime-fit: determine risetime τ_{max} from data

$\rightarrow$ predict P_{max}, calibrate observed P_{measured}.

Main problem: Spin-rotators and beam-beam effects: $f_P \neq f_\tau$

Proposal: TPOL calibration

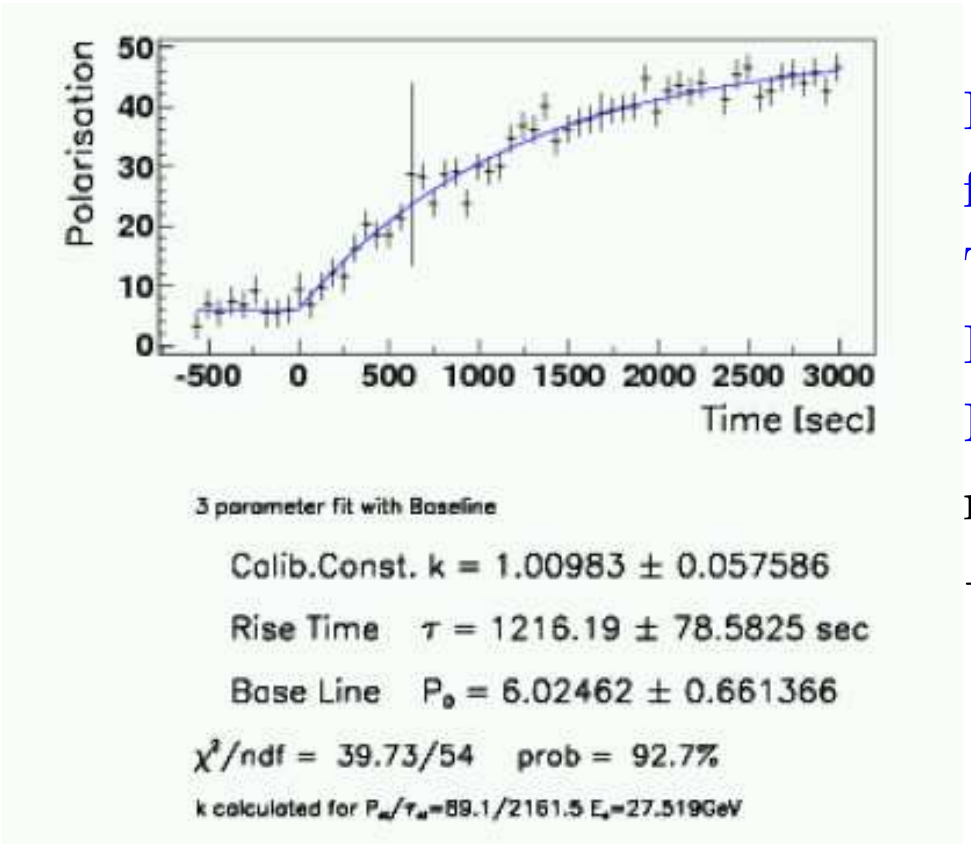
Turn off H1 and ZEUS solenoids, HERMES target magnet, Spin rotators and operate machine without protons.

$\rightarrow f_P = f_\tau$, use risetime method to obtain absolute calibration of transverse polatimeter.

Present systematic uncertainty: $\frac{\Delta P}{P} = 3\%$

Goal: $< 1.5\%$

Requires absolute calibration of TPOL with 1% precision.



Example: risetime-curve (spin-rotators on) from end-of-fill summer 2006 $\rightarrow$ 40 mA in flat machine

TPOL single point: 3% $\rightarrow$ 1%

Risetime fit error: 5% $\rightarrow$ 2%

Machine Monte-Carlo: 3% (?) $\rightarrow$ 0% (flat machine)

require at least 10 curves $\rightarrow$ 2 days

+ machine setup time for 50% polarisation (3 days?)