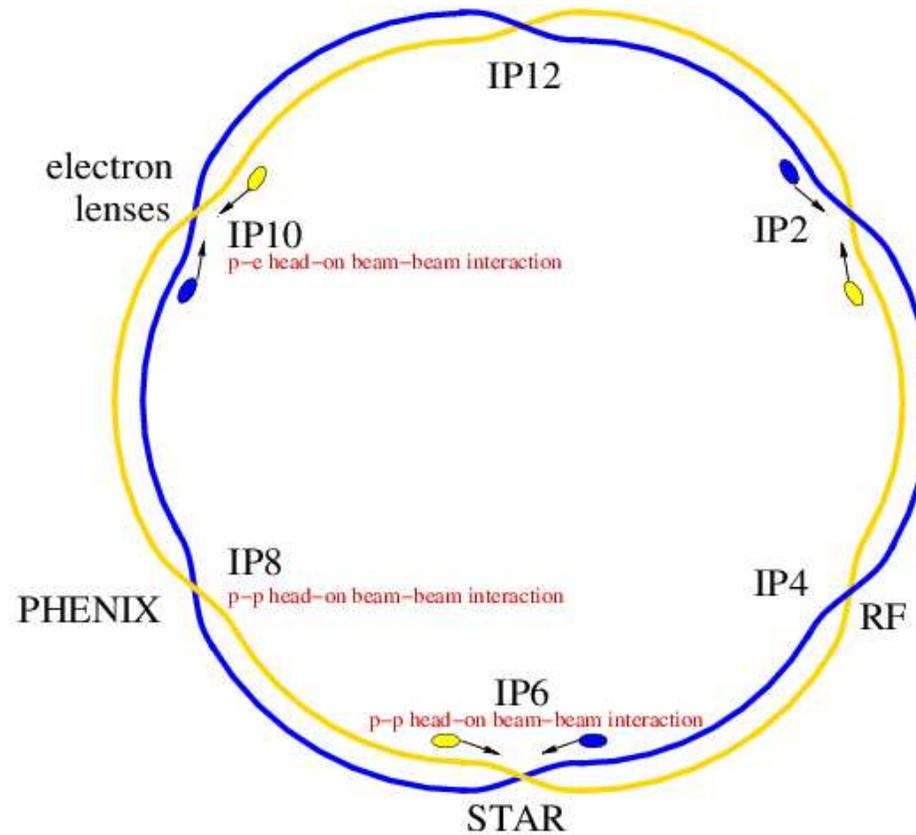


# Studies for the e-lens

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APEX Workshop, November 12 – 13, 2009

## Beam-beam compensation scheme

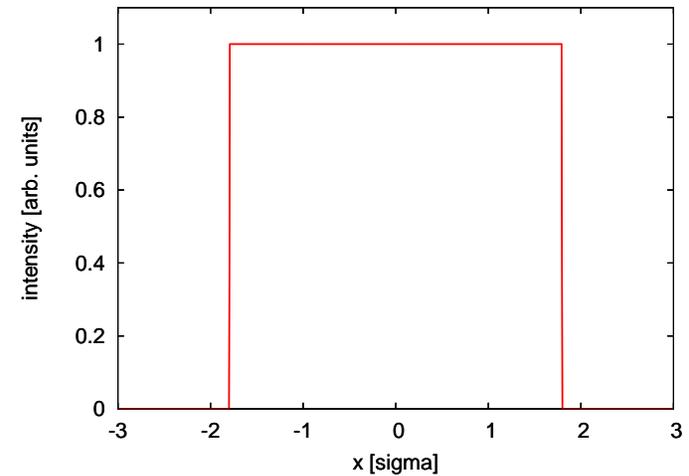
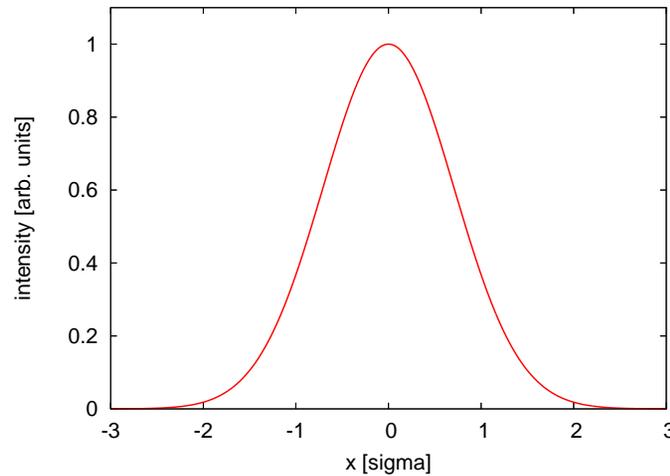


Nonlinear beam-beam kick at IP8 is compensated by opposite kick at IP10



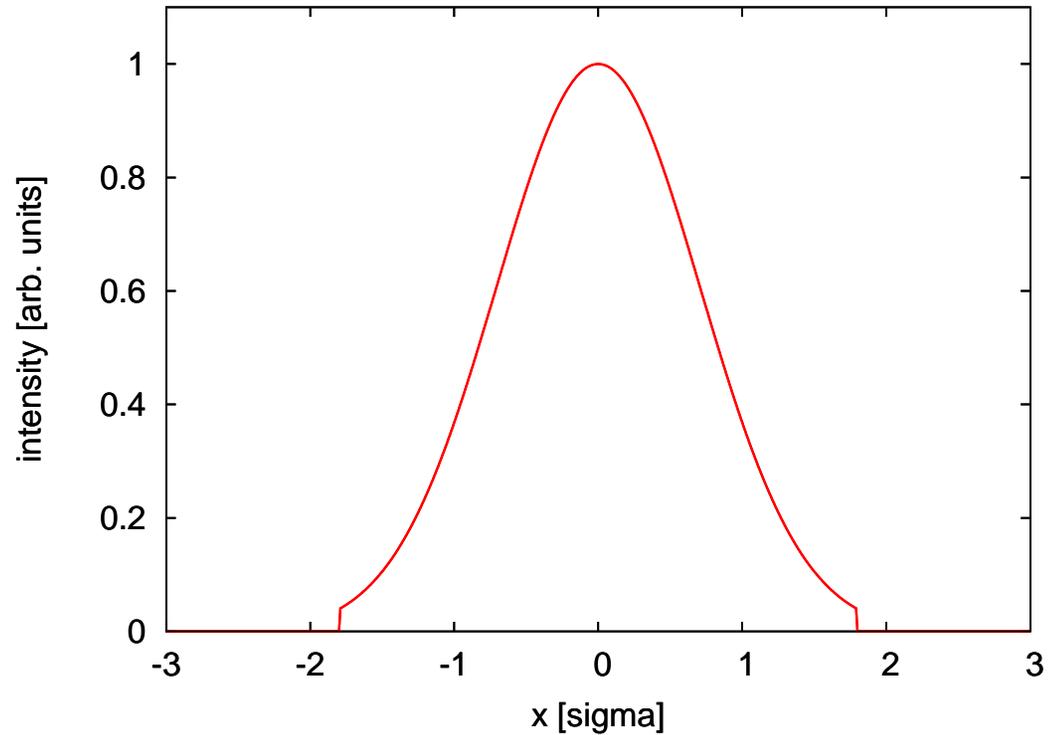
## Requirements (cont.)

- Gaussian electron beam profile



Gaussian profile would be ideal, rectangular profile disastrous

Electron lens profile has a sharp cut-off at  $2.8\sigma$  due to limited cathode size:



Sharp edges are generally dangerous, but intensity in the tails is very low  
(Cut-off shown at  $1.8\sigma$  for illustrative purposes)

## APEX studies

### 1. Betatron phase shifter

- Two shunt power supplies will be added to main quads in arc IP8 - 10, to allow control of betatron phase advance
- For different values of the phase advance, measure optics with AC dipole
- With beams in collision in IPs 8 and 10, observe  $\pi$ -mode with BTF as function of phase advance

## 2. Gaussian beam profile

- Collide beams in IPs 6 and 8
- Collimate (=scrape) Blue beam aggressively, down to 2-3  $\sigma$
- Observe Yellow beam lifetime as function of Blue collimator position
- Measure beam profiles with IPM and Vernier scan ( $\chi^2$ -test)