Loss Rate Simulation Results

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HEBL meeting

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Simulation parameters

Parameters used in simulations:

- 10000 particles
- 600 steps with 10^5 in each (about 21 mins)
- $\sigma_y = 0.06$ [cm]
- electron beam radius $r_b = 3.5, 3.75, 4.0, 4.5\sigma_y$
- $L = 200$ [cm], $I = 0.4$ [A], $\beta = 0.13$, skip=1/1

HEBL models in simulations

Since $skip = 1/1$:

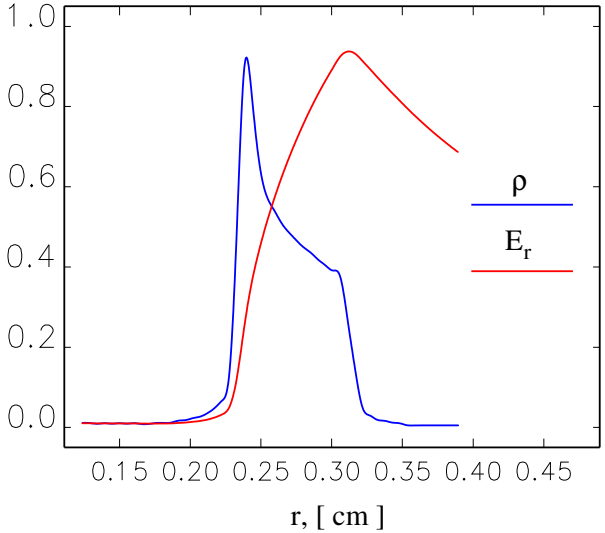
- ideal HEBL model

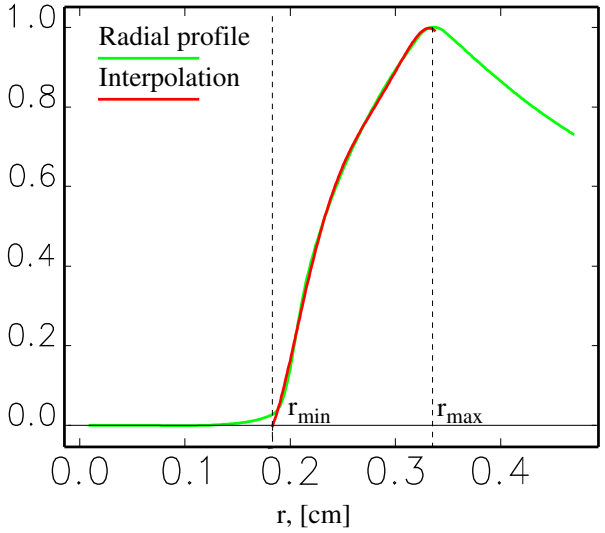
$$\Delta p_r = \begin{cases} 0 & \text{if } r < r_1 \\ 2\Omega_e \frac{r^2 - r_1^2}{r(r_2^2 - r_1^2)} \Delta s & \text{if } r_1 < r < r_2 \\ 2\Omega_e \frac{1}{r} \Delta s & \text{if } r > r_2 \end{cases}$$

- radial HEBL model

$$\Delta p_r = 2\Omega_e \frac{f(r)}{r_m} \Delta s$$

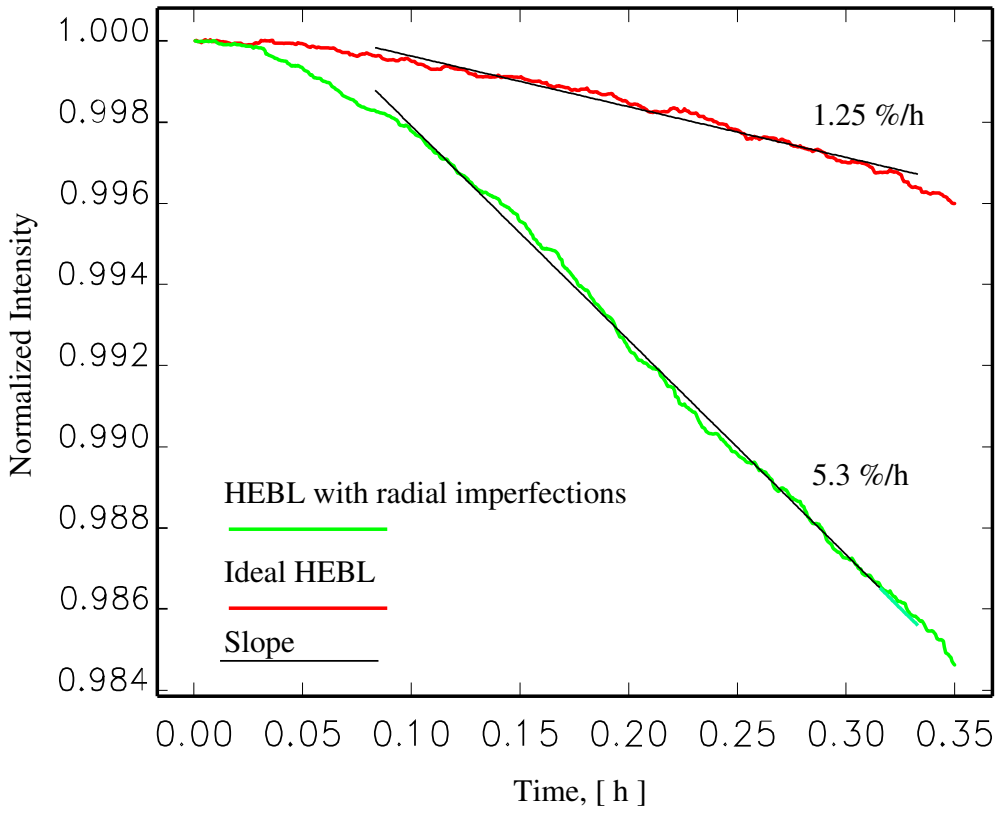
$$\Omega_e = 0.3 \times 10^{-7} \frac{I(A)}{p_{\bar{p}}(GeV/c)} \gamma_b \frac{1 + \beta_b \beta_{\bar{p}}}{\beta_b \beta_{\bar{p}}}$$



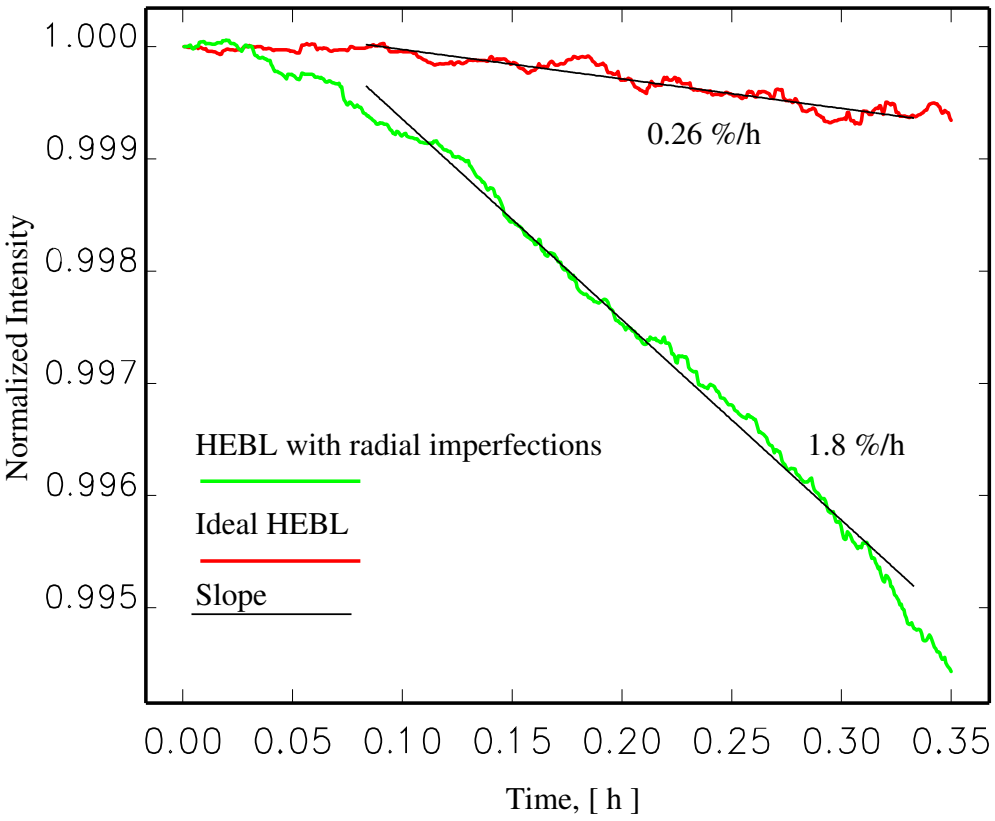


Loss rate (1)

$r_b = 3.5\sigma$

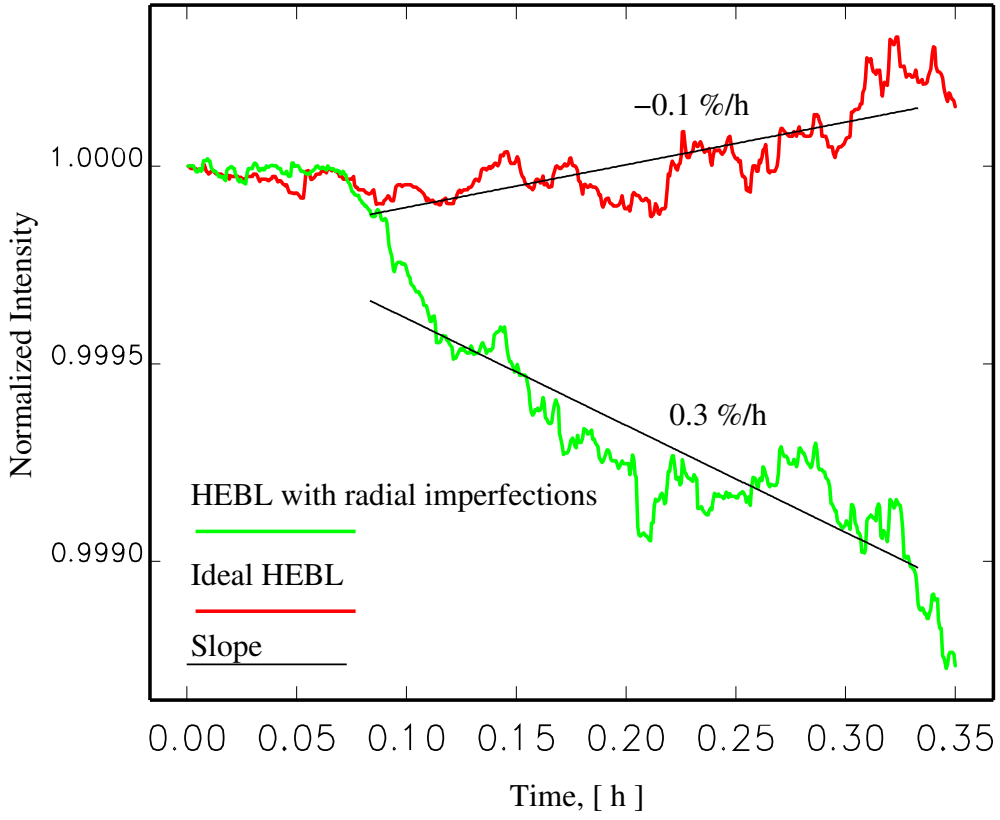


$r_b = 3.75\sigma$

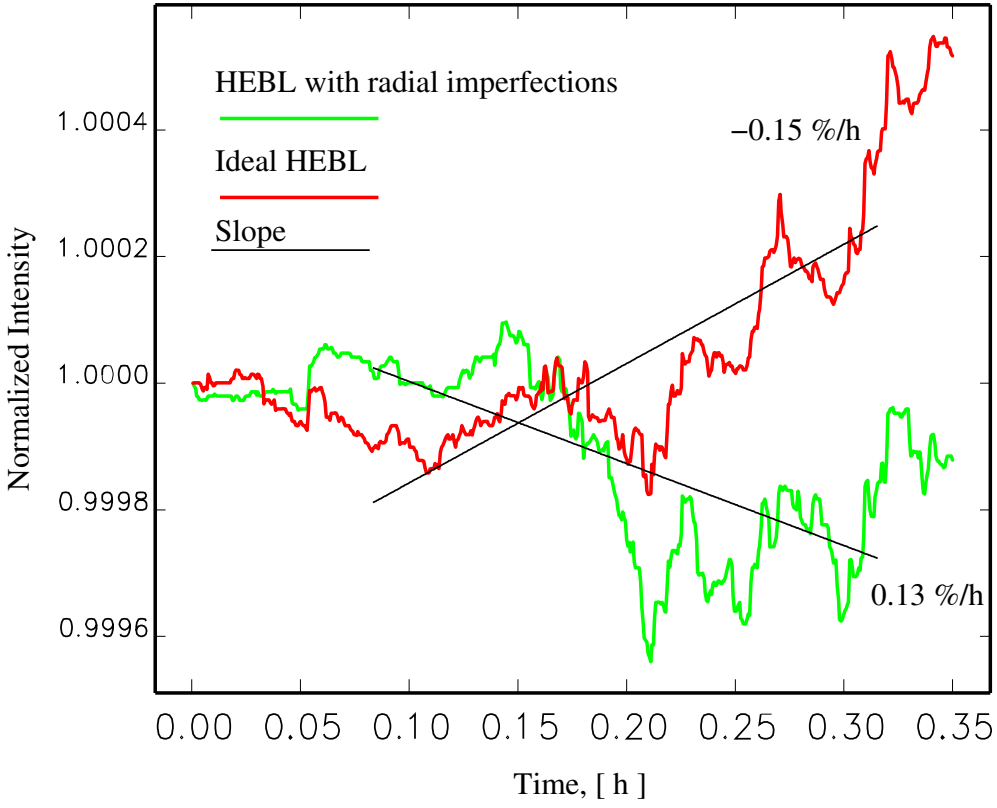


Loss rate (2)

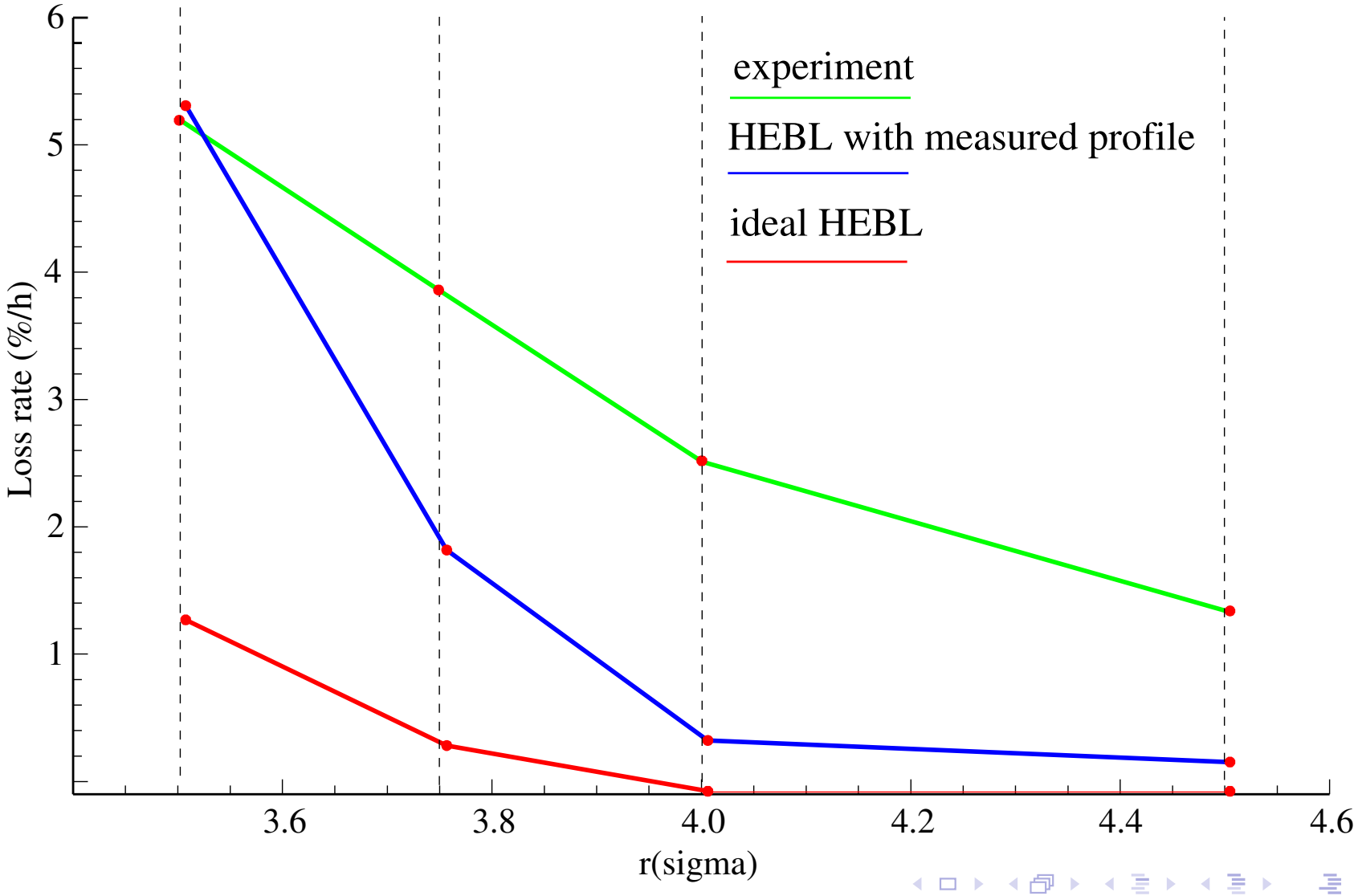
$r_b = 4.0\sigma$



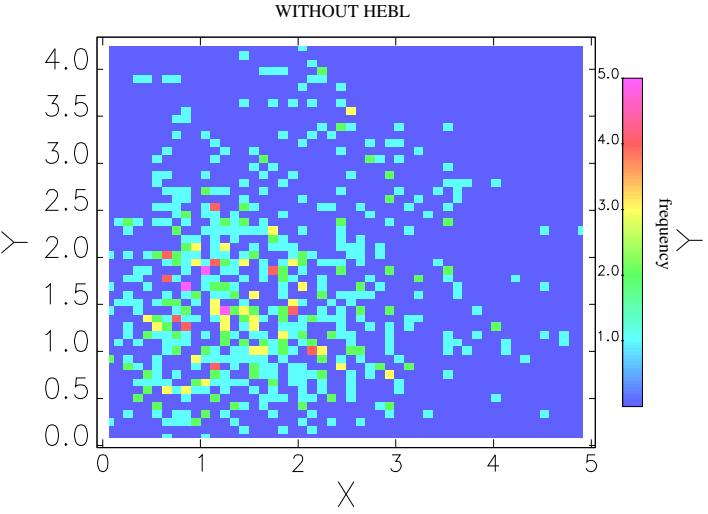
$r_b = 4.5\sigma$

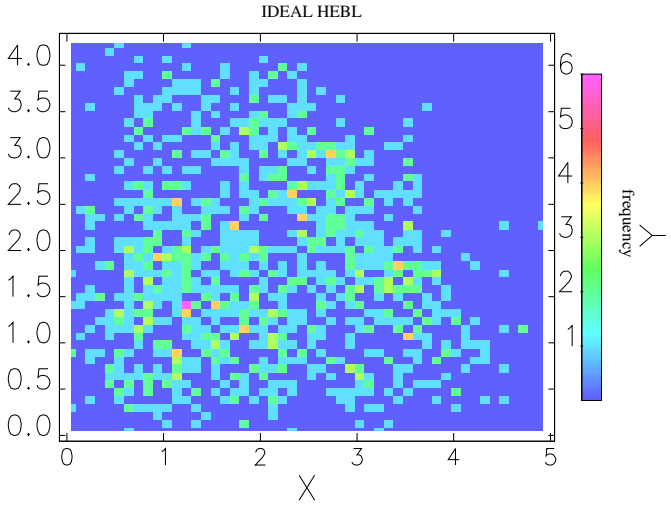


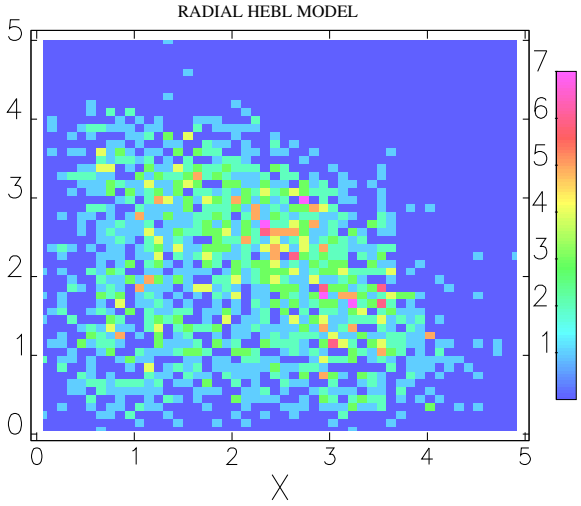
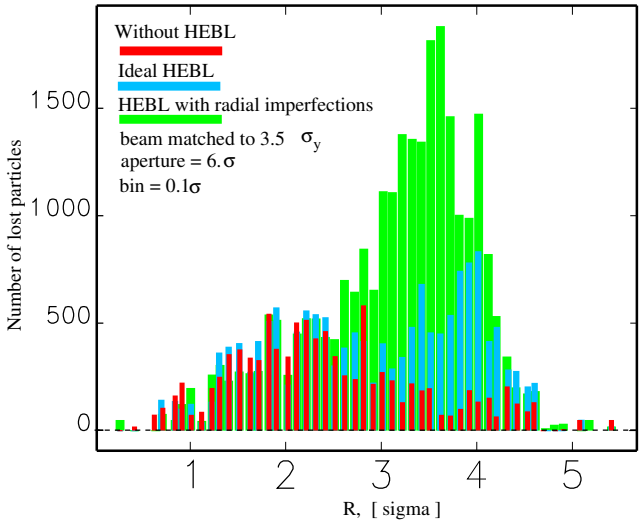
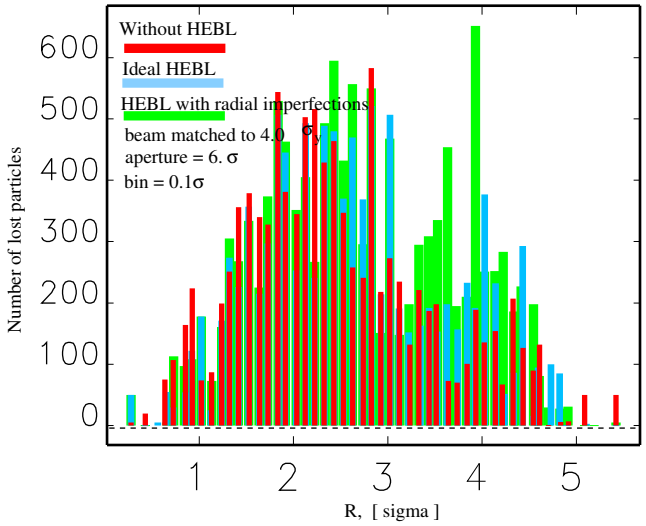
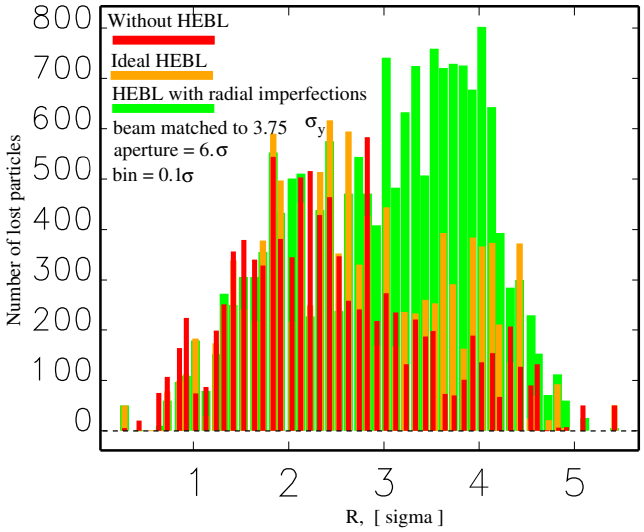
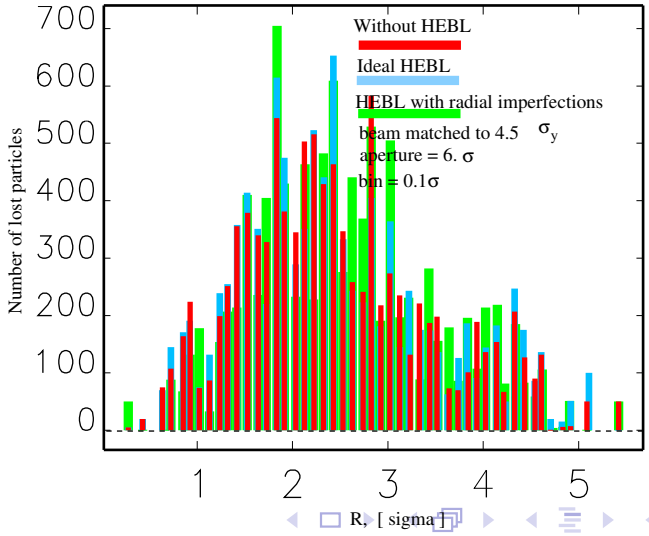
Simulations vs experimental data



2D-hist of lost particles







Lost particles vs amplitude