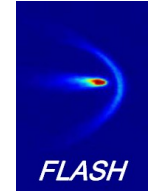


Summary of FLASH CSR measurements

Bolko Beutner, DESY

Beam Dynamics Meeting 21.8.2006

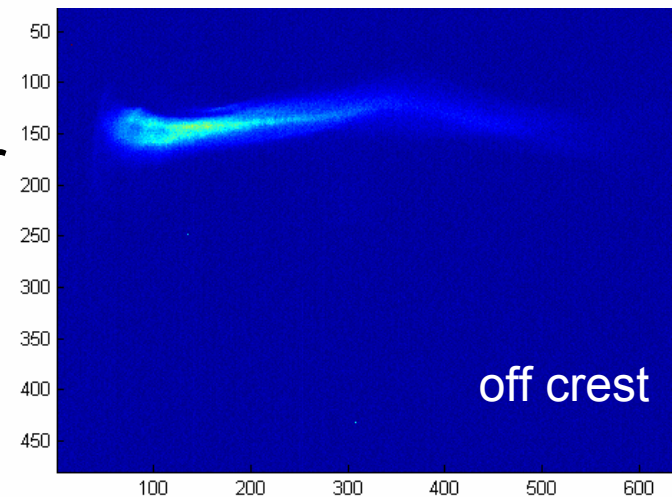
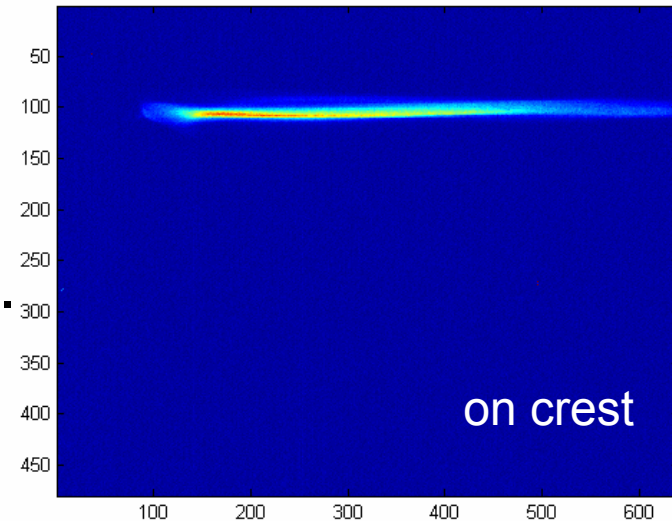


- Introduction
- Measurement Summary
 - What has been done?
 - Problems
- Outlook

In strong over-compression scenarios
 CSR effects are the main
 contribution to self interacting forces.
 CSR emission lead to a centroid sag.

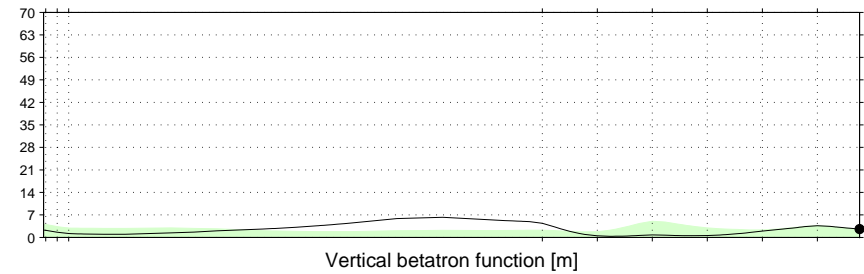
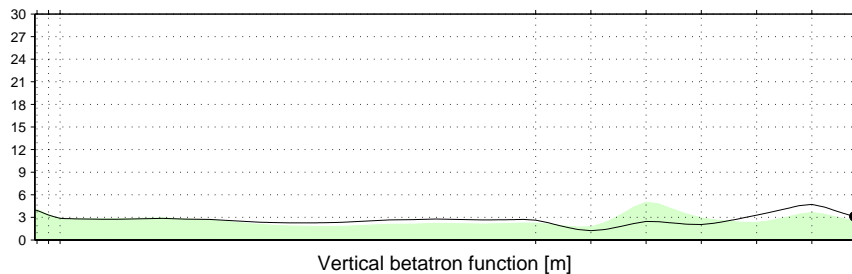
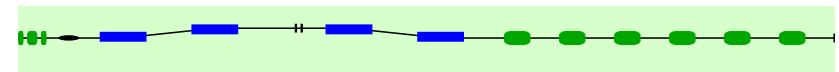
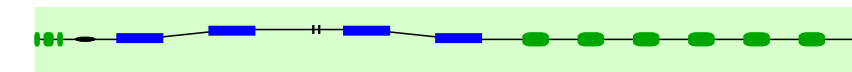
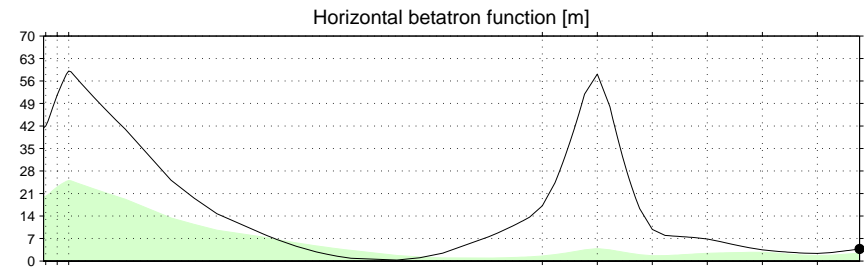
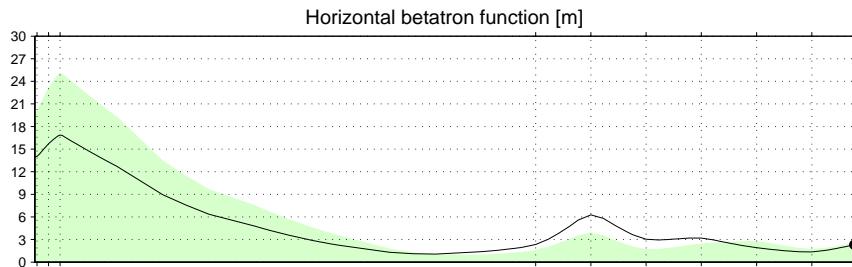
CSR Measurements on the 29/30.7
 and the 6.8.2006 were done.

The program was to measure CSR
 induced centroid shifts with LOLA for
 different optics in BC2 and bunch
 charges.



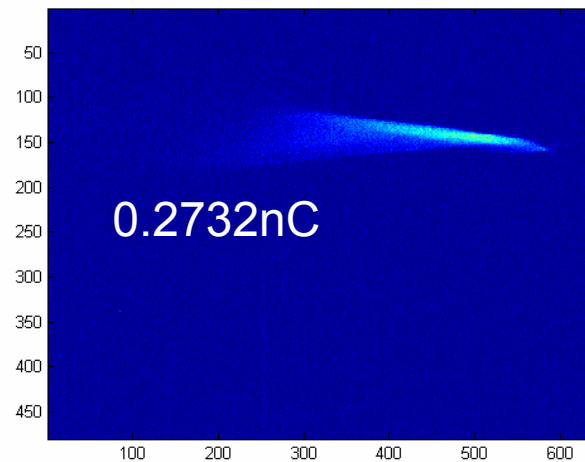
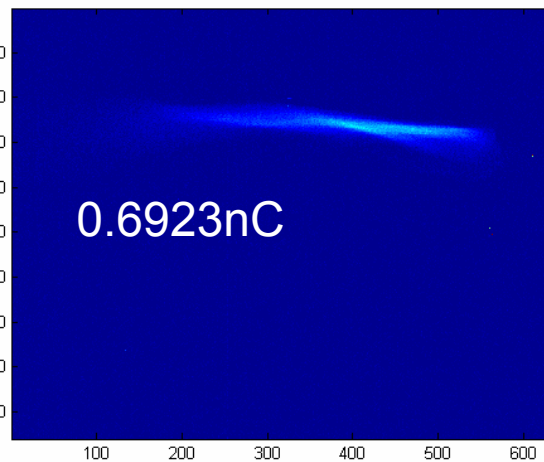
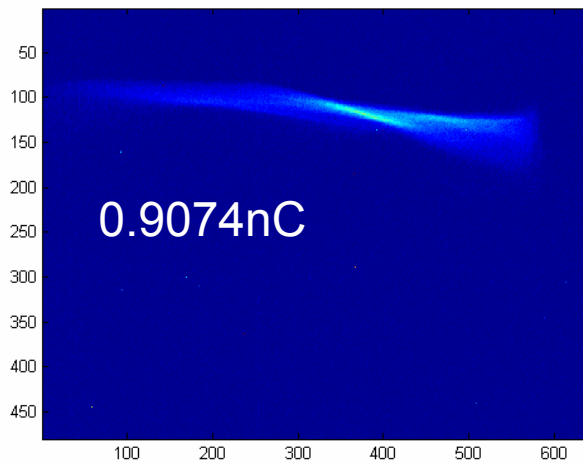
What has been done? 29/30.7

- Machine setup / Orbit tuning and correction
- Two different optics were set up during the shifts
- Data are taken with LOLA
- Problems with the photoinjector laser stopped work here....

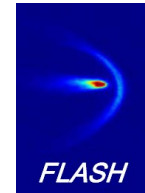


What has been done? 6.8.

- Machine setup / Orbit tuning and correction
- The centroid shifts were observed for different bunch charges.
- Qualitatively the centroid sag scale with bunch charge
- Bad beam quality makes an numerical analysis difficult
- Effects of space charge in the injector on the optics has to be analysed

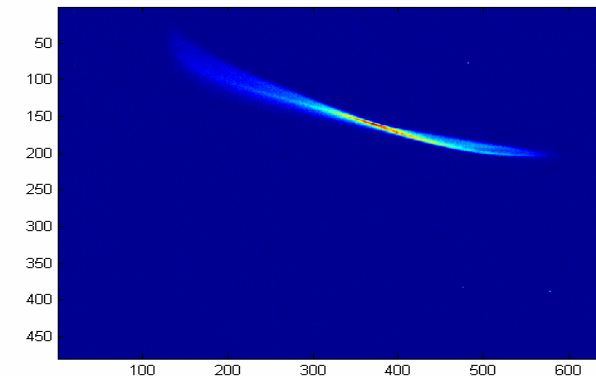


Problems



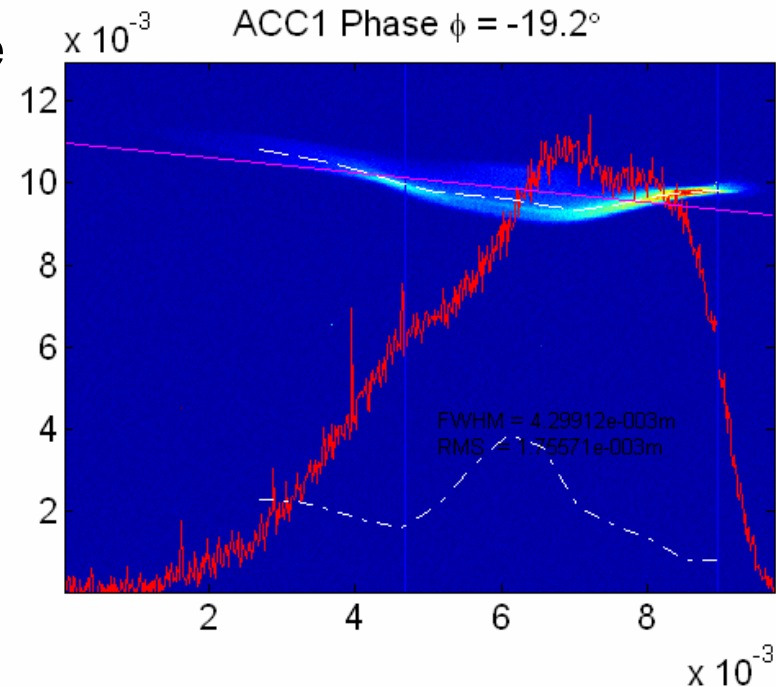
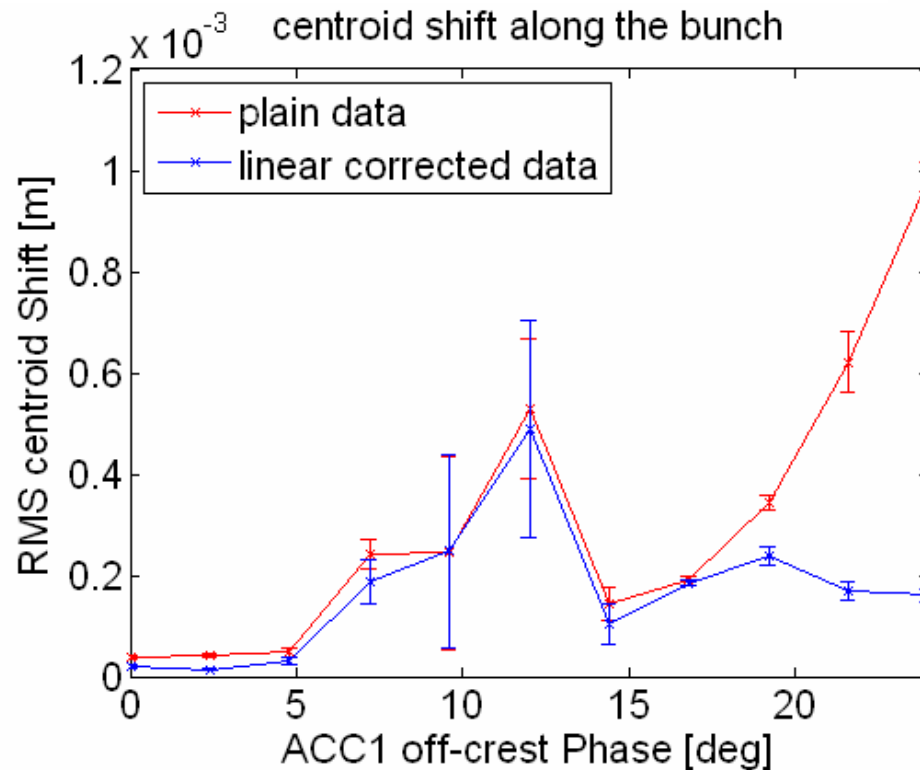
The main problems during the measurement shifts were:

- Optics setup in BC2 is difficult due to unknown beam parameters after ACC1 and the not well understood quadrupole triplet Q1/2/3UBC2.
- One shift was lost due to laser problems in the injector
- Distortions of the long beam – careful orbit tuning necessary
 - Better understanding is required
 - Coupler kicks?
 - Transverse fields due to off axis orbit in the modules or LOLA?
 -



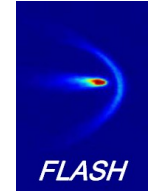
Problems

- Beam tilt reduction by orbit optimisation
- The remaining beam tilt is treated by subtracting the linear correlation of the centroid curve.



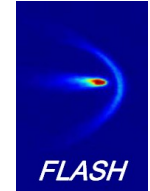


Summary



- CSR induced centroid shifts are observed
- Study of optics in BC2 on CSR is not completed
- Qualitative observation of scaling with bunch charge

Outlook



- Two shifts on 26.8.2006
 - Setup for different bunch charges.
 - Setup of optics in BC2 with an beam waist in the second dipole.
 - Further analysis of beam tilts
- Data Analysis going on
 - Quantitative evaluation of charge and optics dependence
- Comparison with detailed start-to-end simulations.

