Coherent Diffraction Radiation experiment

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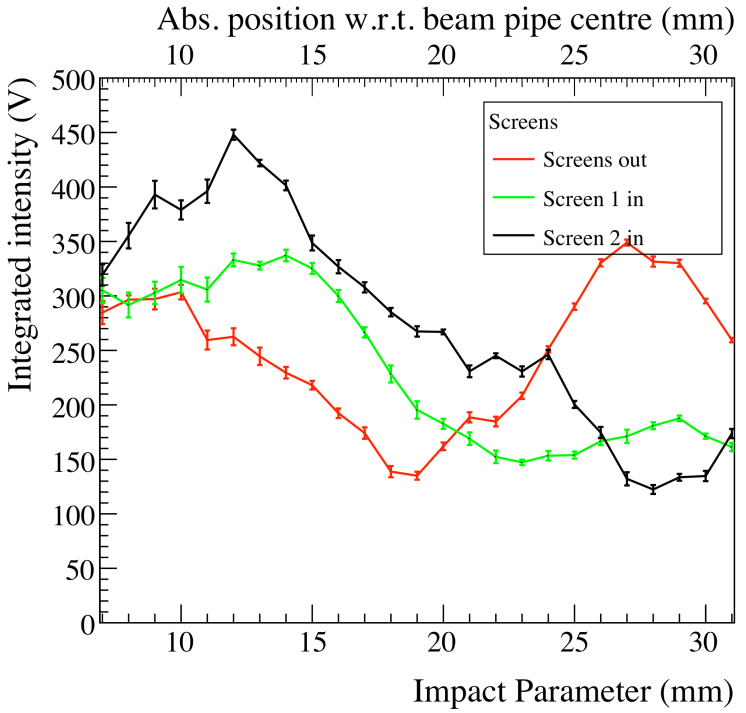
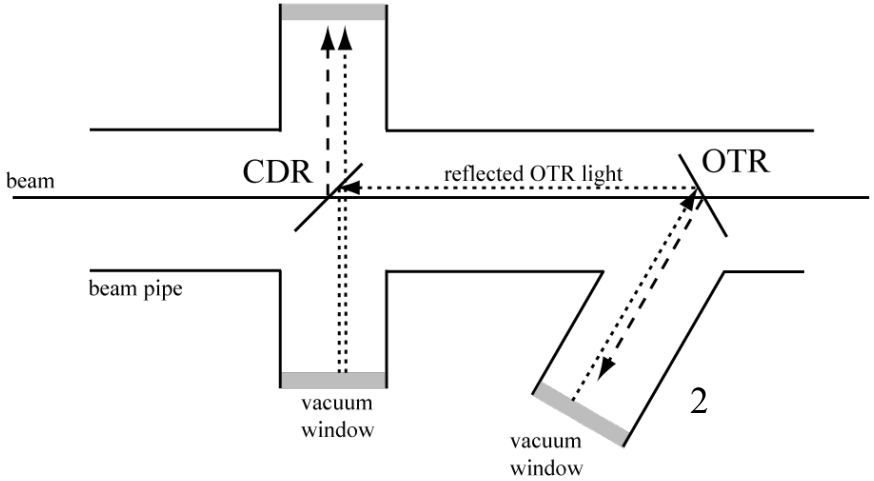
Background at CDR:

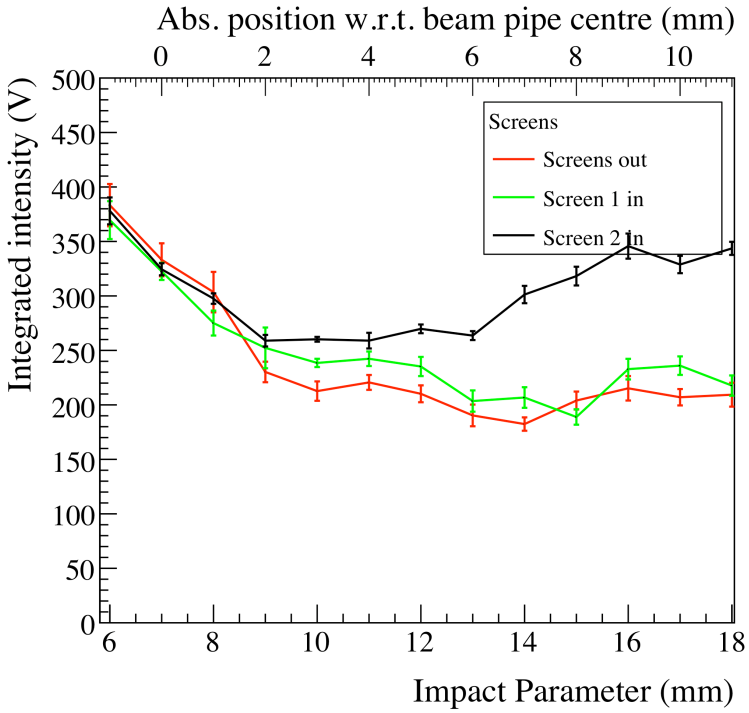
- Observed a large background from the OTR screen behind the setup
  - high reflecting screen gives higher background (photon yield ~ reflectivity)
  - low reflecting screen gives a smaller background
  - vacuum window of OTR screen reflects light back towards the CDR setup + reflection of light from our six-way cross
- Possible background from beam dump





Possibility to cut off this background:

- used vertical corrector before the CRM line to lower the position of the beam (by about 8 mm)
- therefore able to lower the target as well without touching the beam
- observing a convergence of the signal levels for low impact parameter
- target starts cutting of the background as it is covering more of the vacuum window



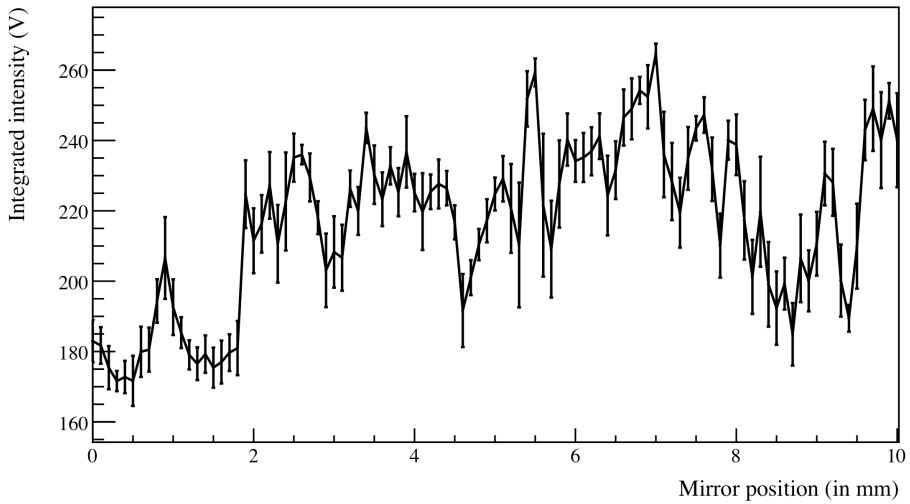
☞ Off-center adapter flange to cut off backgrounds

Initial studies

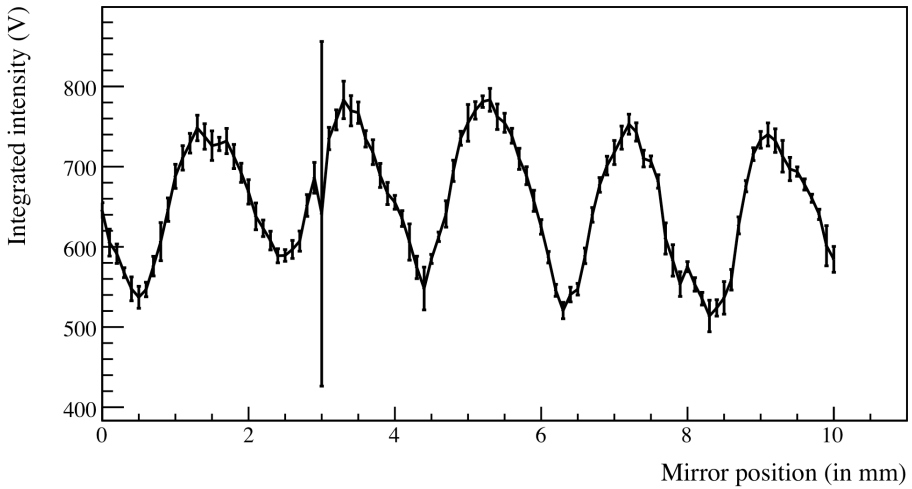
Interferometer:

- Detecting the horizontal component does not result in intensity change when performing a scan
- Scan of the vertical component shows a variation. However, it seems periodic
  - ☞ perform a scan over a wider range
- Mylar beam splitter has a bi-axis birefringence
  - might influence phase map
  - ☞ insert polariser
  - ☞ use different splitter

Horizontal polarisation



Vertical polarisation



Initial studies

Other activities:

- The photodiode (for an alternative charge reading) is not working as expected
  - currently testing the diode in the lab
- Extending the functionality of the DAQ program
- Konstantin Lekomtsev is currently working on Kramer-Kronig reconstruction method
- Konstantin is at CERN from May until August 2009
- Had some dedicated beam, which was very useful

☞ thanks to the commissioning team for their support

Summary & Outlook

Summary:

- Observed some CDR signals
- Discovered some downstream backgrounds from OTR screen/dump
    - able to identify the source/reason of the main backgrounds
- Do not totally understand the interferometer

Outlook:

- Design of an off-center flange (in progress already)
- Understanding the interferometer, i.e. polariser and/or different splitters
- Obtain a good understanding of the system

Good start into the experimental phase!!!