Collimation working group

Oliver Aberle

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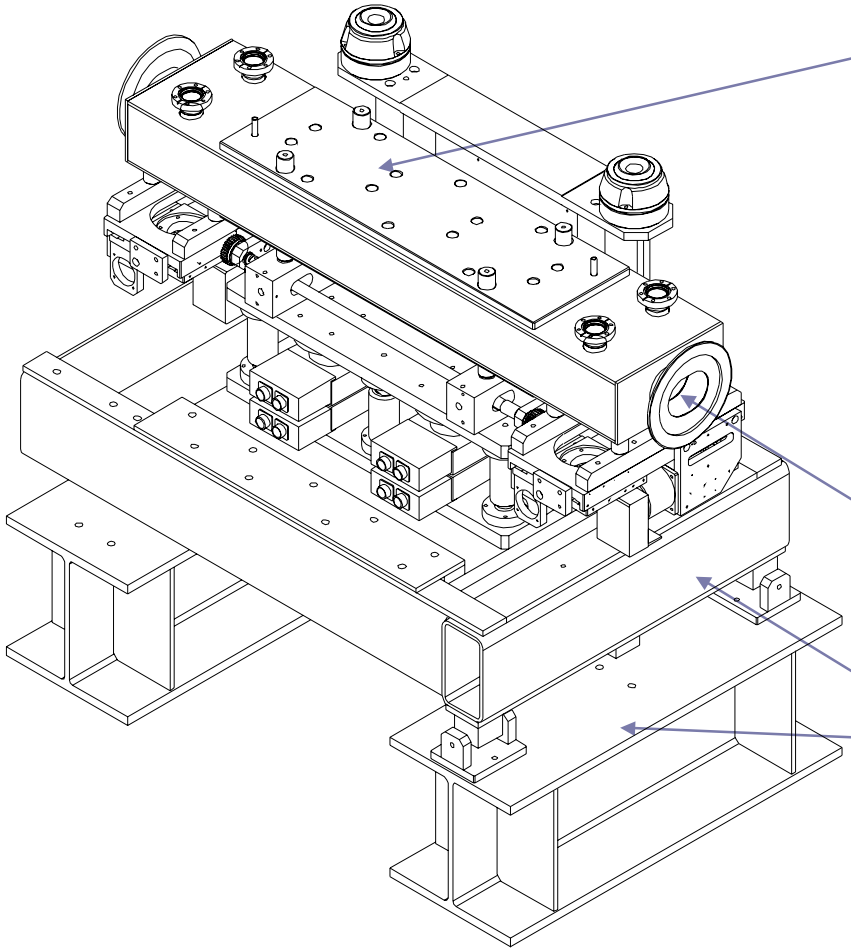
Flatness of collimator (TT40) after robustness test at the SPS

Overview

- LHC collimator prototype (TCS)
- Materials
- Beam parameters for the robustness test in the SPS
- Flatness measurements
- Summary

Robustness Test: TCS prototype



Vacuum tank

Plug-in system not shown

Beam axis

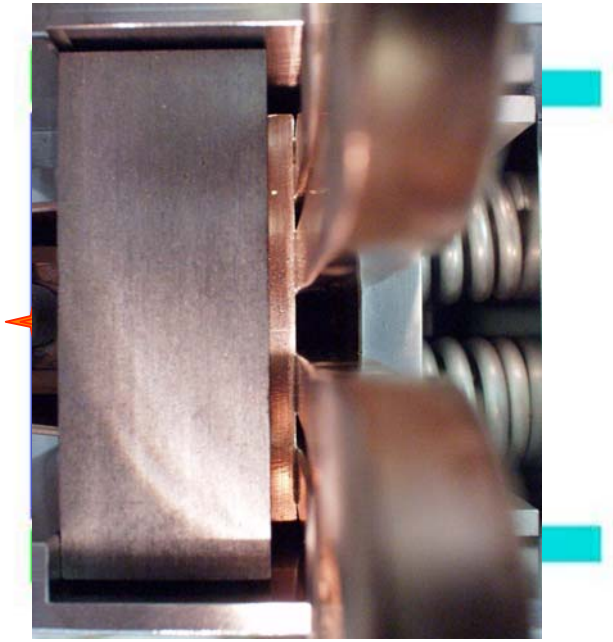
Support

Material for used for prototype

- Graphite (SGL R4550) and Carbon-carbon Tatsuno/Across AC150
  (very similar robustness!)
- No RF contacts
- Jaw assembly:
  Stainless steel beam, Cu water pipes and contact plate, clamps in stainless steel

LHC collimator prototype (TCS)

- Full size horizontal collimator
- Jaw length 1.2m
- Jaw material CFC and Graphite
- Movement with
  LEP motors (2 per jaw)
- Clamped jaws, water cooled

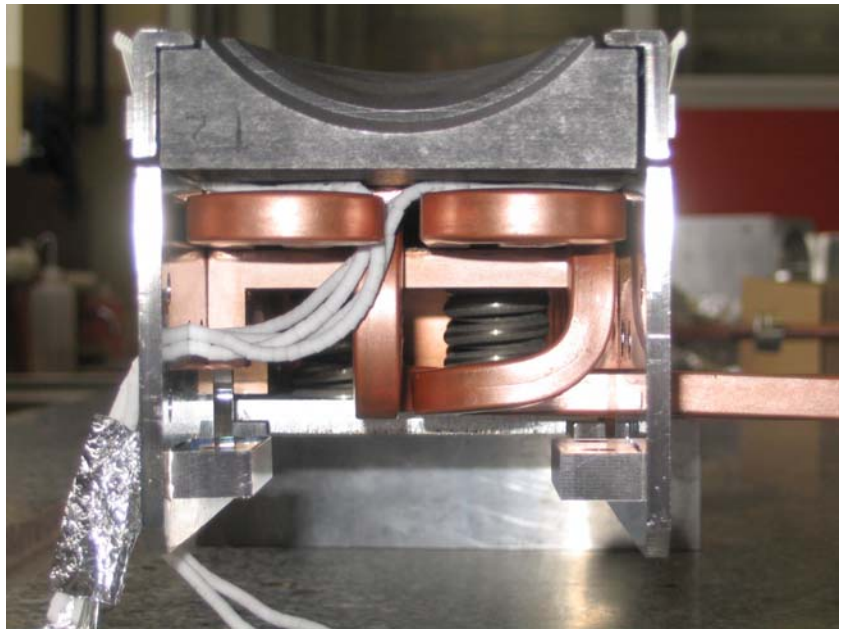


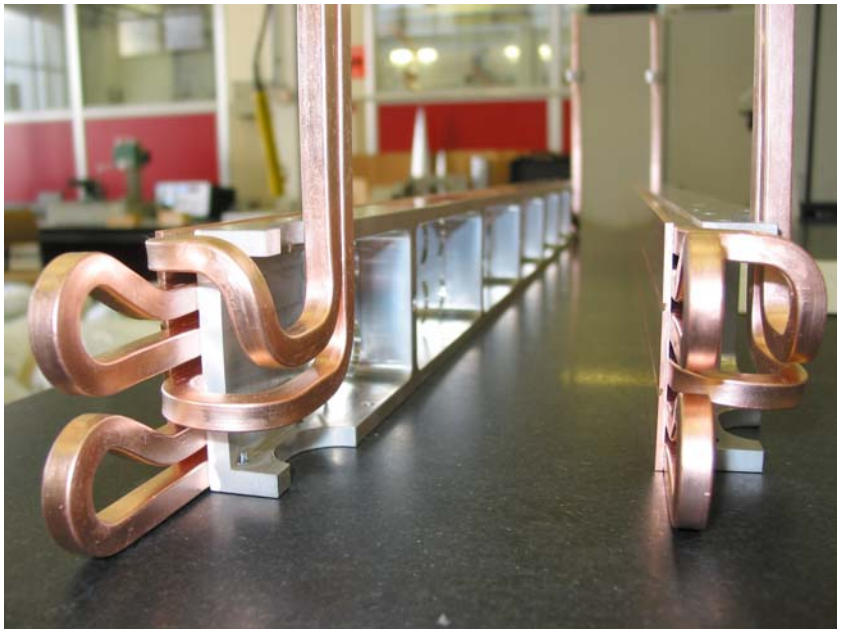
Beam parameters

- Extraction of 4 _ 72 bunches,
  1.1 _ 10^{11} protons each (2.4 MJ)
- Robustness test with 5 shots
  450 GeV, beam size 1 mm
- Several shots with less intensity at 5 mm depth
- Both jaws with same beam impact parameters

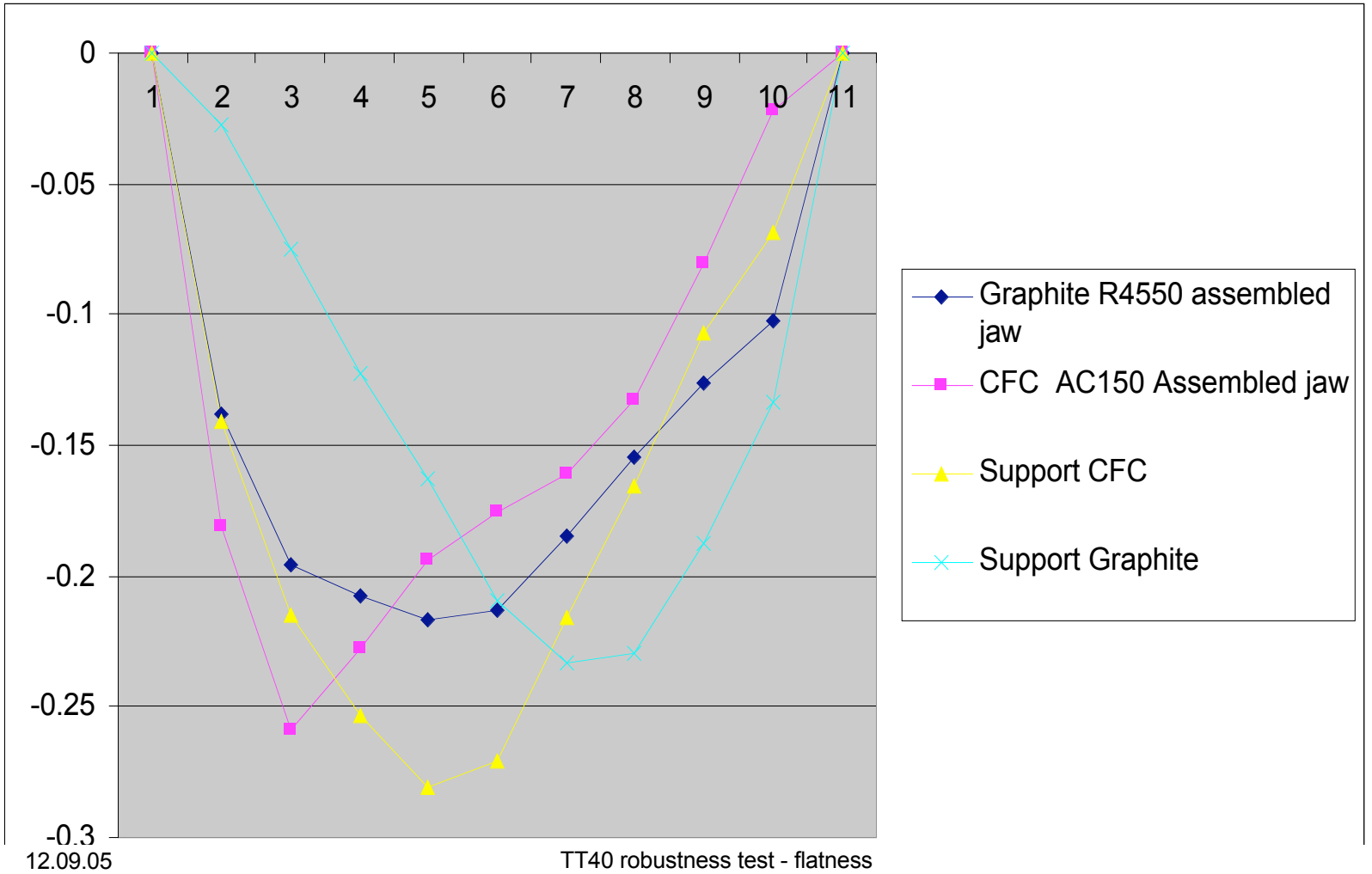
Flatness measurements

Measurement of assembled jaw
and metallic support





Flatness measurements



Flatness measurements

3 lines with 10 measures on a center line and 2 mm from the edges

- CFC jaw before and after test:
  Flattness 25 micron
- Graphite jaw before and after test:
  Flattness 18 micron
- Metallic support before assembly:
  60 µm (CFC) / 80 µm (Graphite)
- Assembled jaw in the collimator tank:
  88 µm (CFC) / 121 µm (Graphite)

Summary

- CFC and Graphite show no dimensional change (further material test will follow)
- Prototype materials not the ones for the series: CuNi for CU pipes and Glidcop for Cu contact plate will reduce the deformation ➔ Alessandro
- Effect of “start” deformation without bake out?
- Cleaning efficiency of a deformed jaw (80 µm?)