Update on Crystal Collimation Studies with Ion Beams

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Overview of Measurements

Measurements performed in preparation for potential EoF tests during a commissioning fill (1h30 total): **complete** set of measurements for operation purposes

**Initial Setup**
- Crystal alignment
- Angular scans to find channeling orientation

**Loss Maps**
- With upstream collimators open
- With operational settings
- With progressively tighter TCLA gaps

**Asynchronous Beam Dump**
- Confirmed to be safe by TE-ABT
B1H Loss Maps
B1V Loss Maps

Betatron losses B1 6370 Z GeV Vertical 2018-11-8 03:10:48


STD

CRY

Normalized Losses [ray/charges]
B2H Loss Maps

Betatron losses B2 6370 Z GeV Horizontal 2018-11-8 03:17:01

Betatron losses B2 6370 Z GeV Horizontal 2018-11-7 23:29:54

STD

CRY
B2V Loss Maps


Betatron losses B2 6370 Z GeV Vertical 2018-11-7 23:36:05

STD

CRY
Effects of Upstream Collimators

- Comparison between cleaning efficiency measured when upstream collimators are open (MD settings) and closed (operational settings)
- In general the system performance is comparable or lower when in operational settings
Leakage Ratio Comparison

Factor ~7

Factor ~3-4

Factor ~3-4

Factor ~2
Comparison with Xe Beams

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Cleaning Inefficiency Comparison

Normalized Cleaning Inefficiency

B1H

B1V

B2H

B2V

Normalized Cleaning Inefficiency

Q7 Q8-9 Q10-11 Q12-13

Normalized Cleaning Inefficiency

Q7 Q8-9 Q10-11 Q12-13

Normalized Cleaning Inefficiency

Q7 Q8-9 Q10-11 Q12-13

Normalized Cleaning Inefficiency

Q7 Q8-9 Q10-11 Q12-13
Conclusions

- **Complete** set of measurements for operational purposes carried out in 1h30 during a commissioning fill
- Cleaning measurements with Pb beams show a **general improvement** when crystal collimation is deployed
- Results previously obtained with Xe beams are **reproduced**
- A **dedicated MD** is necessary to achieve a better understanding of the differences between the two beams and planes