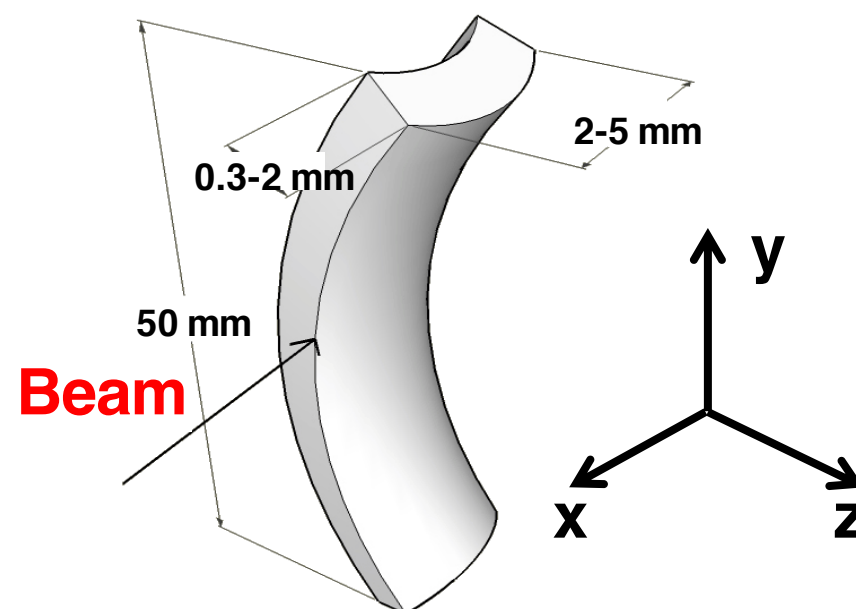
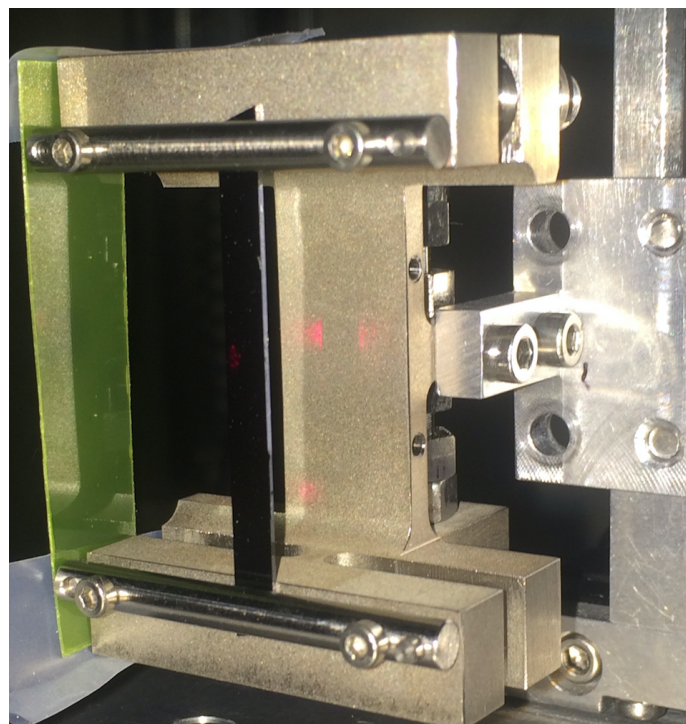




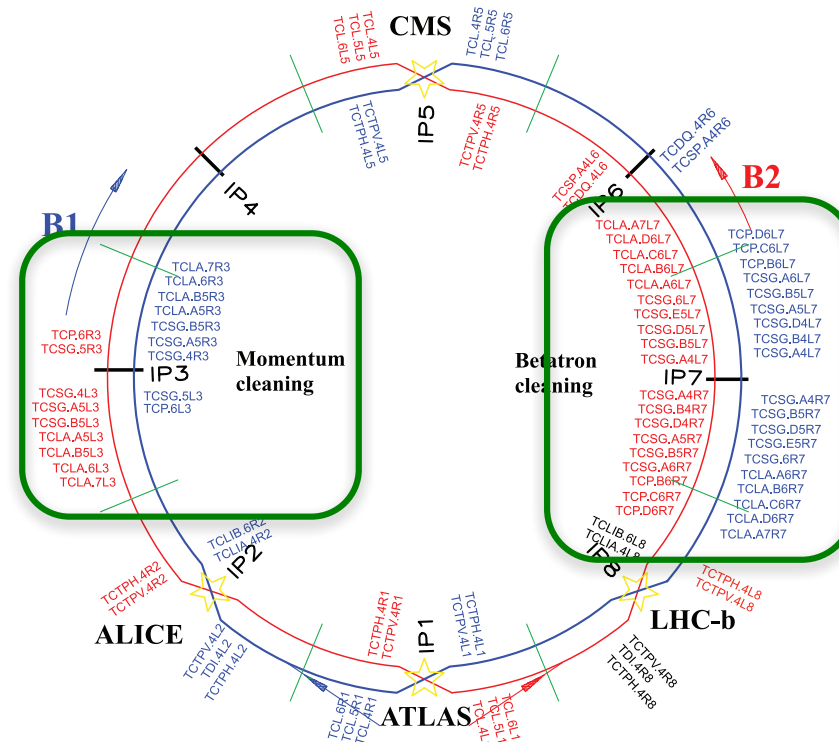
## Beam steering with bent crystals

**Gianluca Cavoto (Sapienza Univ. Roma & INFN Roma)**

[gianluca.cavoto@roma1.infn.it](mailto:gianluca.cavoto@roma1.infn.it)

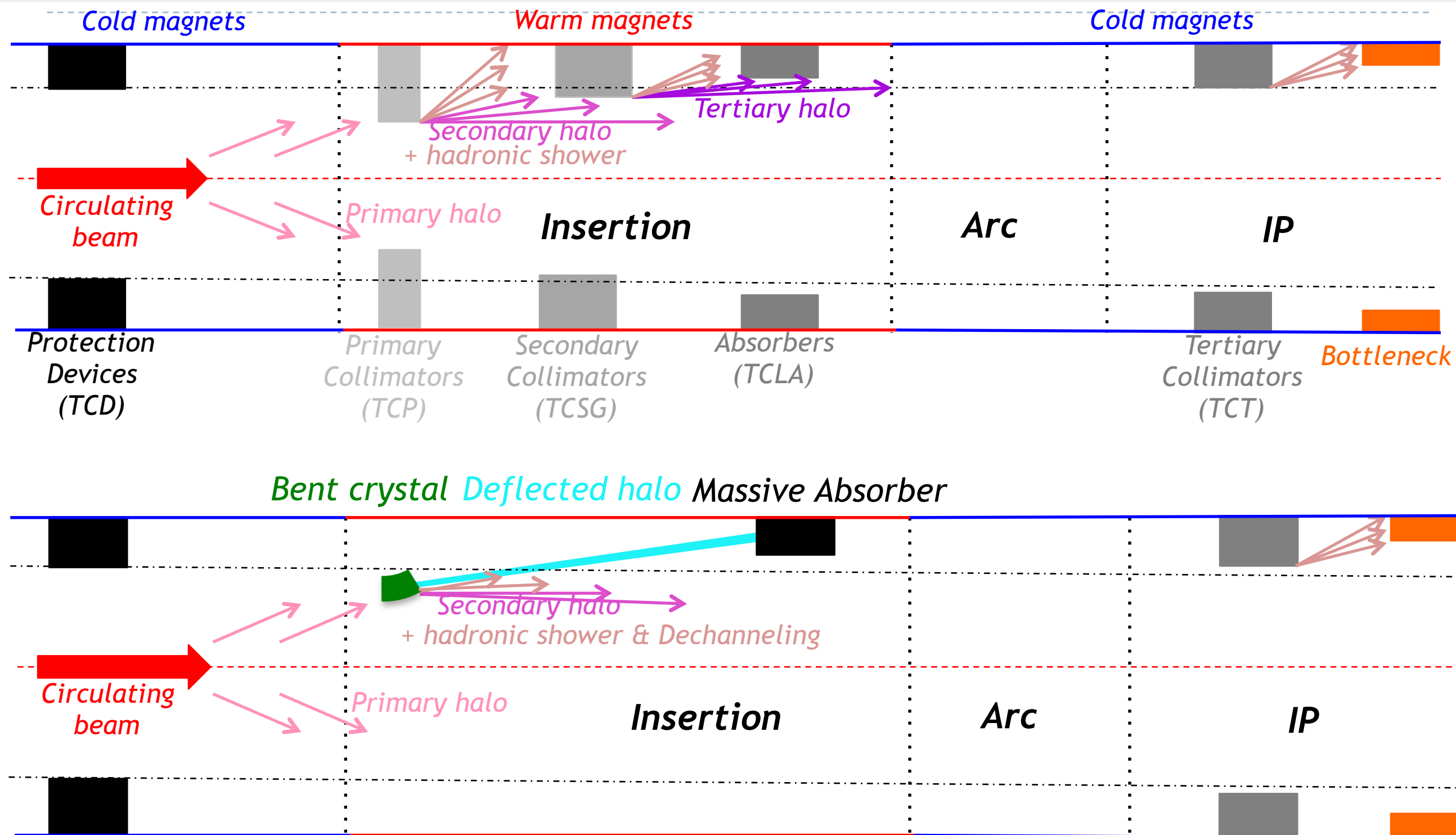
17th October 2016

# Beam collimation at the LHC



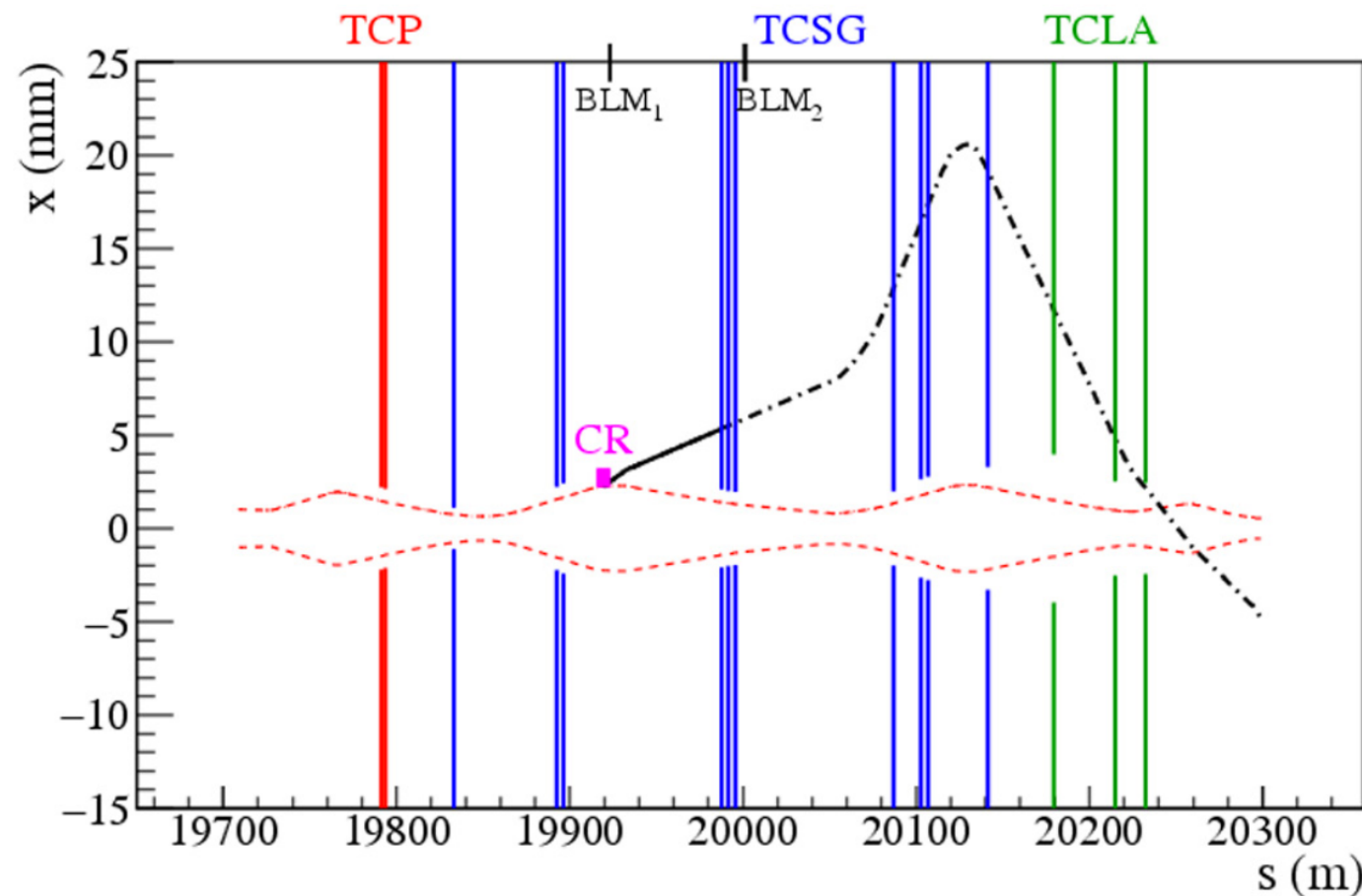
- ▶ The **collimation system** protects magnets and experiments by removing the **beam halo** particles
- ▶ Big chunks of material very close to the circulating beam: **electromagnetic impedance**
- ▶ **Limitation to increase currents**  
(High Luminosity - LHC, especially for lead ion)

# Crystal collimation (LHC)



# LHC crystal channeling

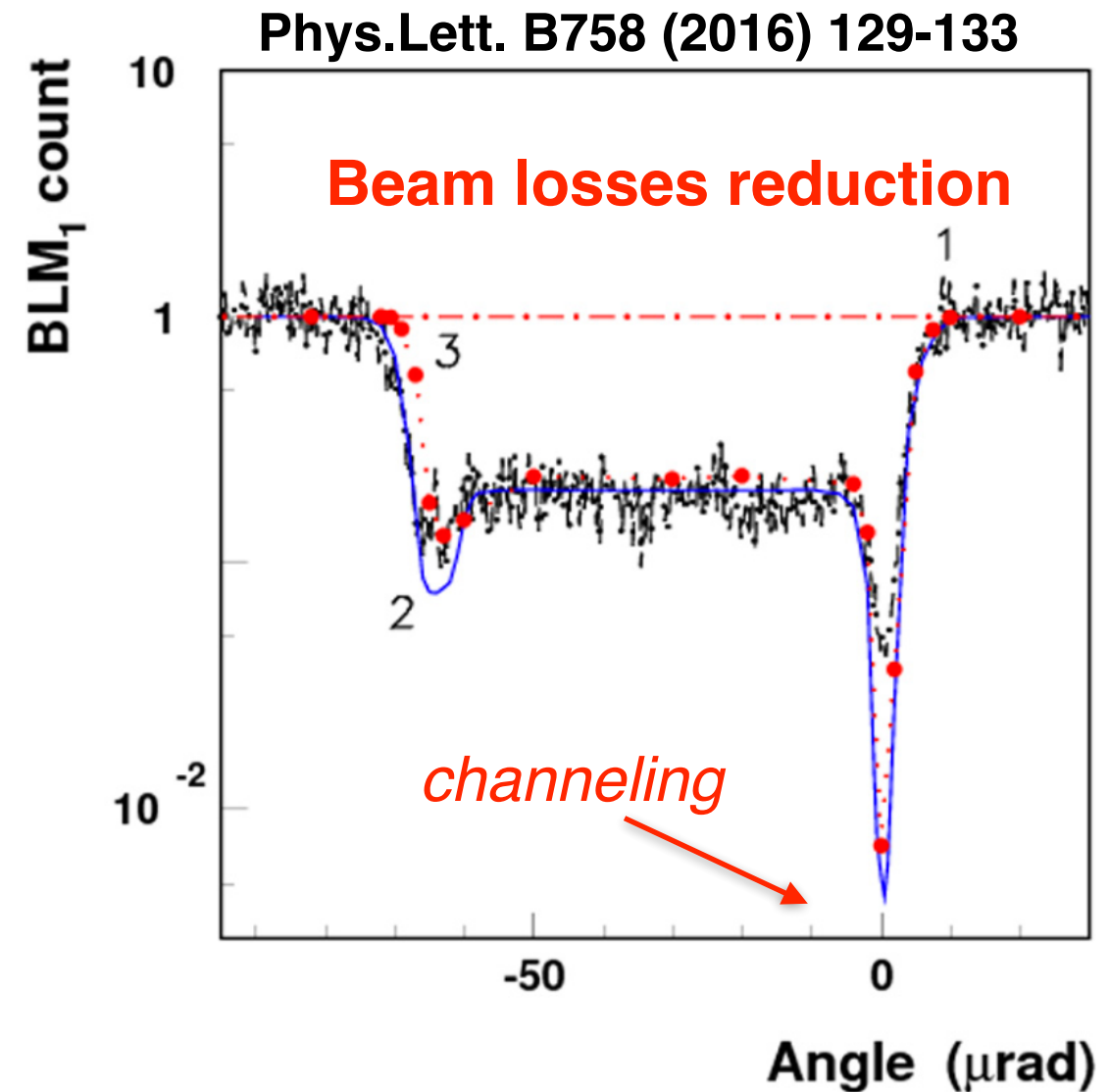
- Successful test with **6.5 TeV protons** in Nov 2015



Beam trajectory in LHC

**~50  $\mu$ rad deflection**

In collaboration with **LHC Collimation** group



Piezo-goniometer (CERN/EN-STI)

Strip crystal (INFN)

- ▶ Crystal for **LHC collimation** of lead ions (after LS2)
- ▶ Crystal validations at CERN H8
- ▶ **SPS - Slow extraction aided with crystals**
  - ▶ experiment on the SPS circulating beam, aim: increasing the extracted current (future beam dump experiment)
- ▶ **Segmented absorber**
  - ▶ Measure hadronic interaction with matter at unprecedented energy.
- ▶ **LHC non-resonant extraction**
  - ▶ Study scheme of extraction of the LHC halo (large bending angles)

# Crystals at CERN



<https://indico.cern.ch/event/523655/>

- Various talks on future crystal applications to accelerators (SPS slow extraction, LHC extraction, split beam in LHC-b)

This workshop will end up with a report to update the European Strategy by the end of the decade.

INFN activity (crystal developments and tests)  
well connected to this