



- INFN Ferrara Section

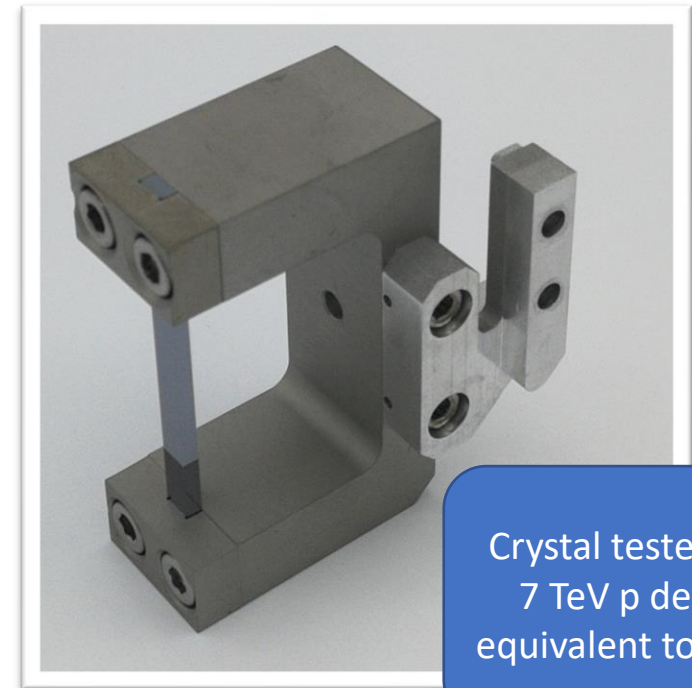
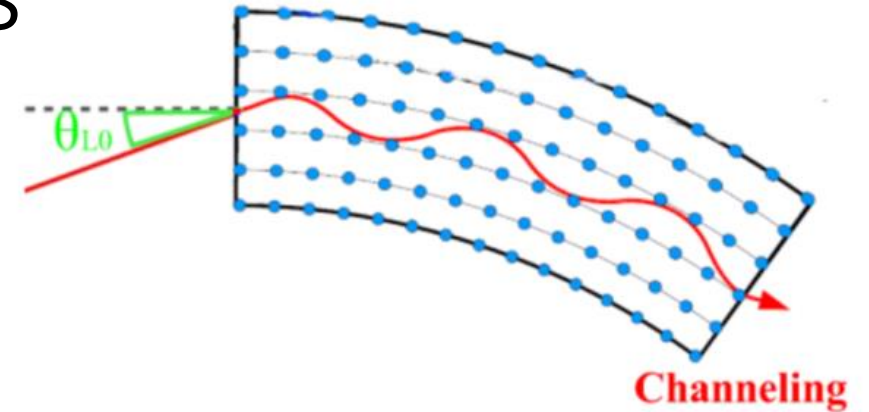
- Marco Romagnoni (PI) 1 FTE
- Melissa Tamisari 0.2 FTE
- Laura Bandiera 0.1 FTE
- Vincenzo Guidi 0.1 FTE
- Andrea Mazzolari 0.1 FTE
- Mattia Soldani 0.1 FTE

- Legnaro National Laboratory

- Francesco Sgarbossa 0.4
- Davide De Salvador 0.1 FTE
- Chiara Carraro 0.1 FTE

A new design for bent crystals

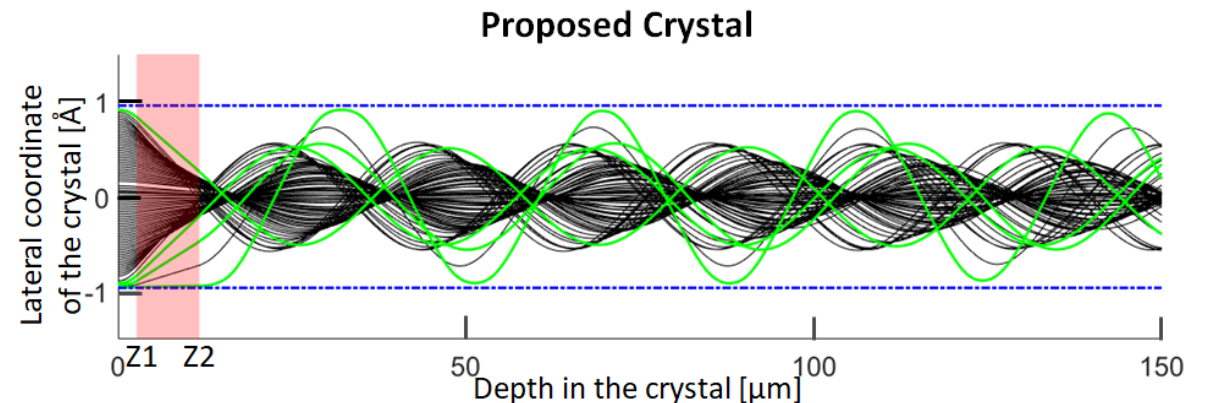
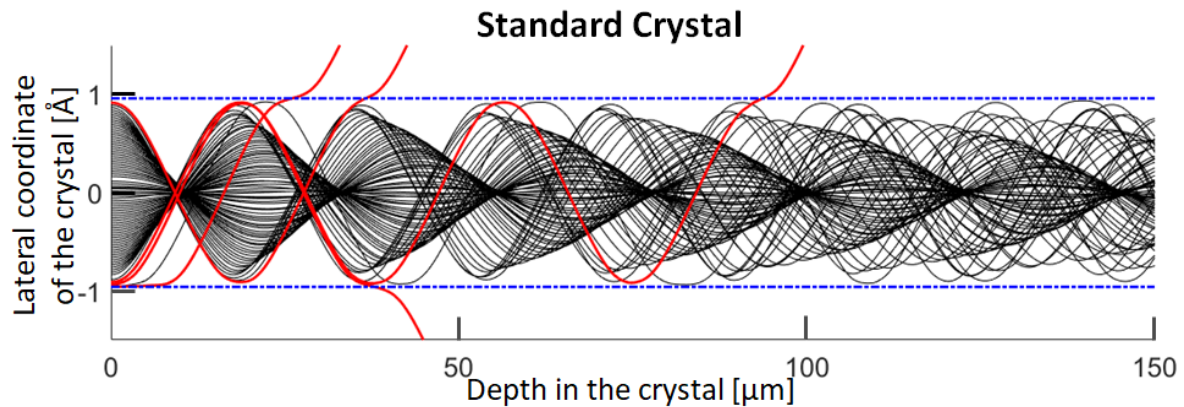
- Bent crystal can assist high energy particle accelerator by deflecting beam with **unprecedented steering power**
- Efficiency of planar channeling **limited to $\approx 80\%$** by intrinsic unstable channeling trajectories inside the bent crystal medium
- GALORE proposes an R&D to develop and test a novel bent crystal design, featuring a focusing microstructure



Crystal tested @LHC :
7 TeV p deflection
equivalent to 276 Tesla

A new design for bent crystals

- Exploit techniques from microelectronic to fabricate micro-trench at the beginning of the crystal
- The first part of the crystal acts as a “channeling lens” by focusing particle trajectories away from nuclei on lattice planes: maximum **efficiency limit** $\approx 100\%$



Work up to June 2022

- MC simulations to optimize geometry and tolerance
- Prime wafers characterization
- Tensile film deposition
- Bending characterization

Next Year goals

- Characterization of microstructure in first batch of prototypes and fine tuning of fabrication recipe
- Production of final prototype
- Test of channeling enhancement at CERN North Area

Founding for II year

Type	Description	Cost
CONS	Crystal Material + validation	4 k€
	Laboratory consumable	0.5 k€
MAN	Clean Room+Instrumentations	16.5 k€
SPSERVIZI	Film deposition	3 k€
	Micrometric trench fabrication	12 k€
INV	Machine Upgrades: XRD detector for lattice plane alignment	23 k€
TRA	Beam Test	9 k€
PUB	Publication Fee	1 k€
	Total	69 k€