INTENSE POSITRON SOURCE FOR FUTURE COLLIDERS

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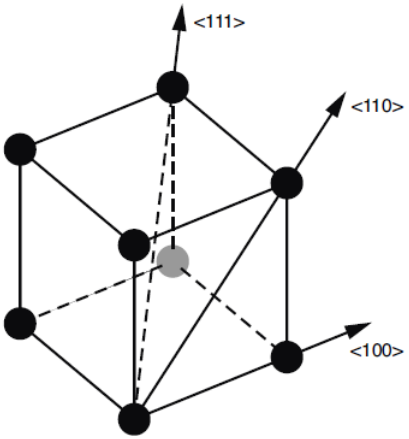
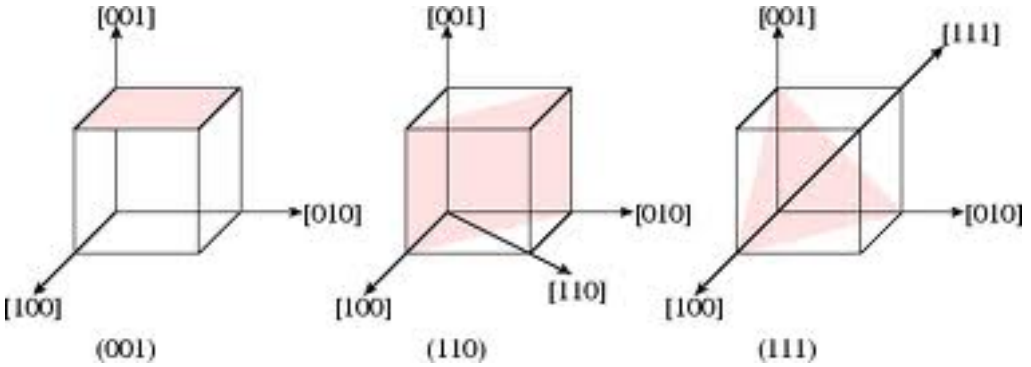
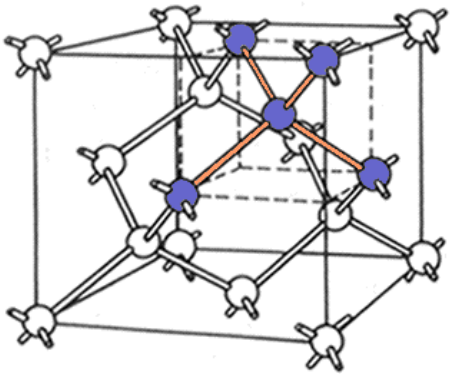
Crystalline solids

A crystal is a solid structure consisting of atoms, molecules or ions having a geometrically regular arrangement, which is repeated indefinitely in the three spatial dimensions, called the **crystal lattice**.



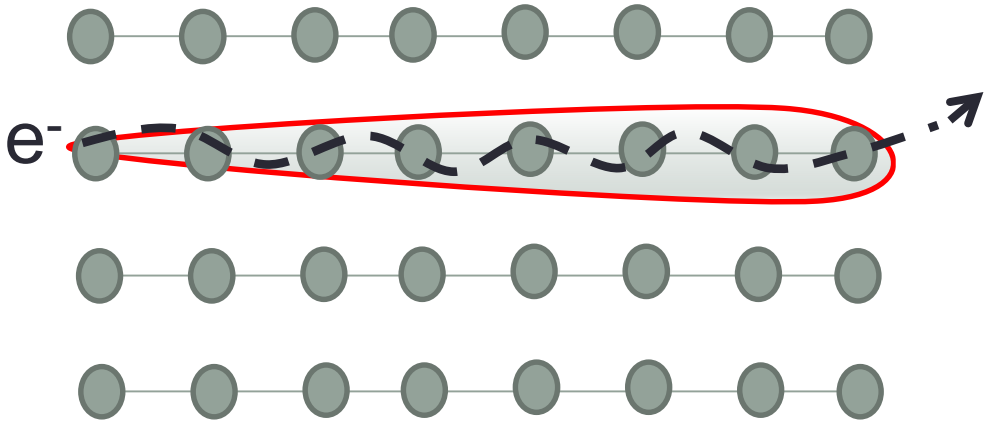


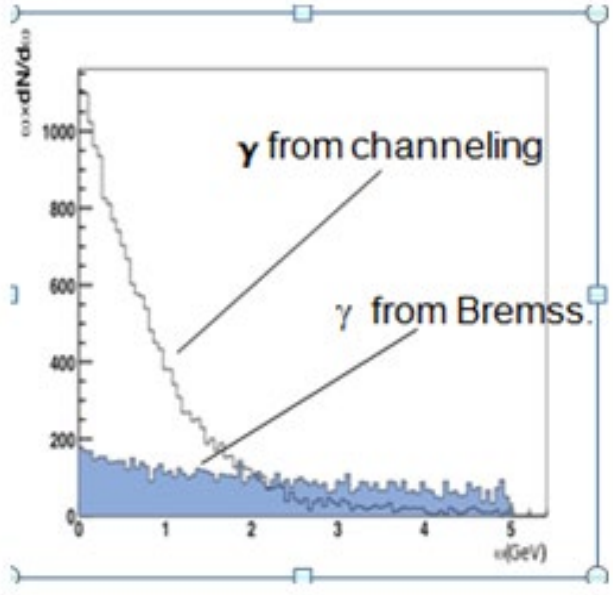
Diamond or Si crystal



Enhancement of bremsstrahlung radiation in oriented crystals: Channeling

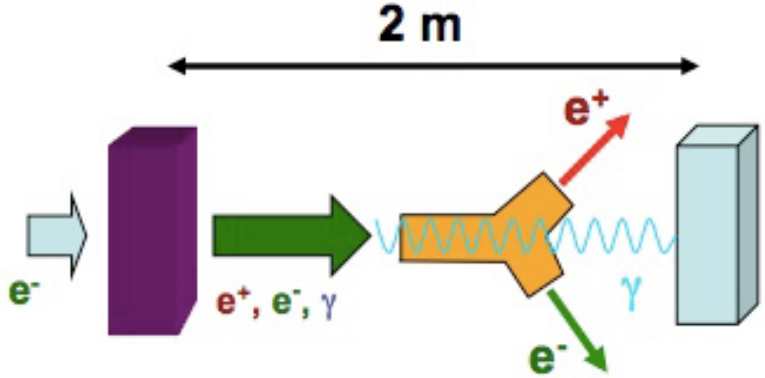
e-





Crystal and amorphous targets of same thickness

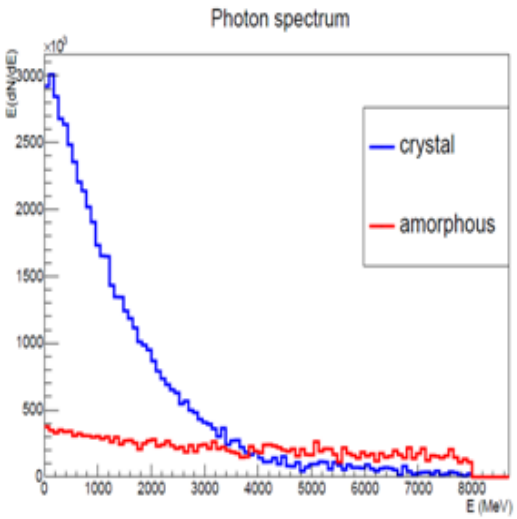
The hybrid positron source using channeling: a promising devices for future colliders

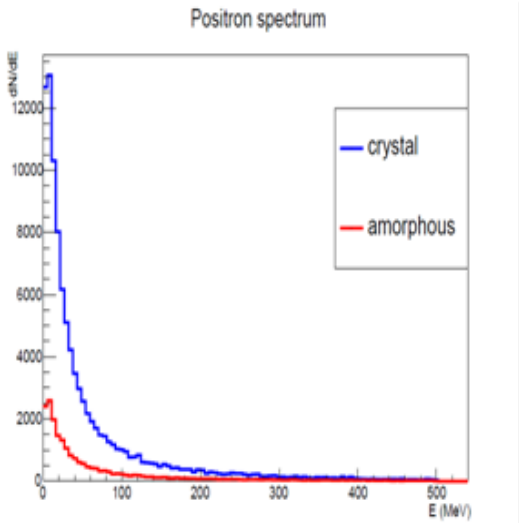


Recent test at KEK in Japan with a W crystal
NIMB 402 (2017) 58

- **Enhancement of photon generation in crystals in channeling conditions ➔ radiation length shorter than in amorphous and decrease with increasing energy.**

*** High rate of soft photons ➔ creation of soft positrons easily captured in matching systems.**





Possible PhD Thesis on a crystal-based positron source

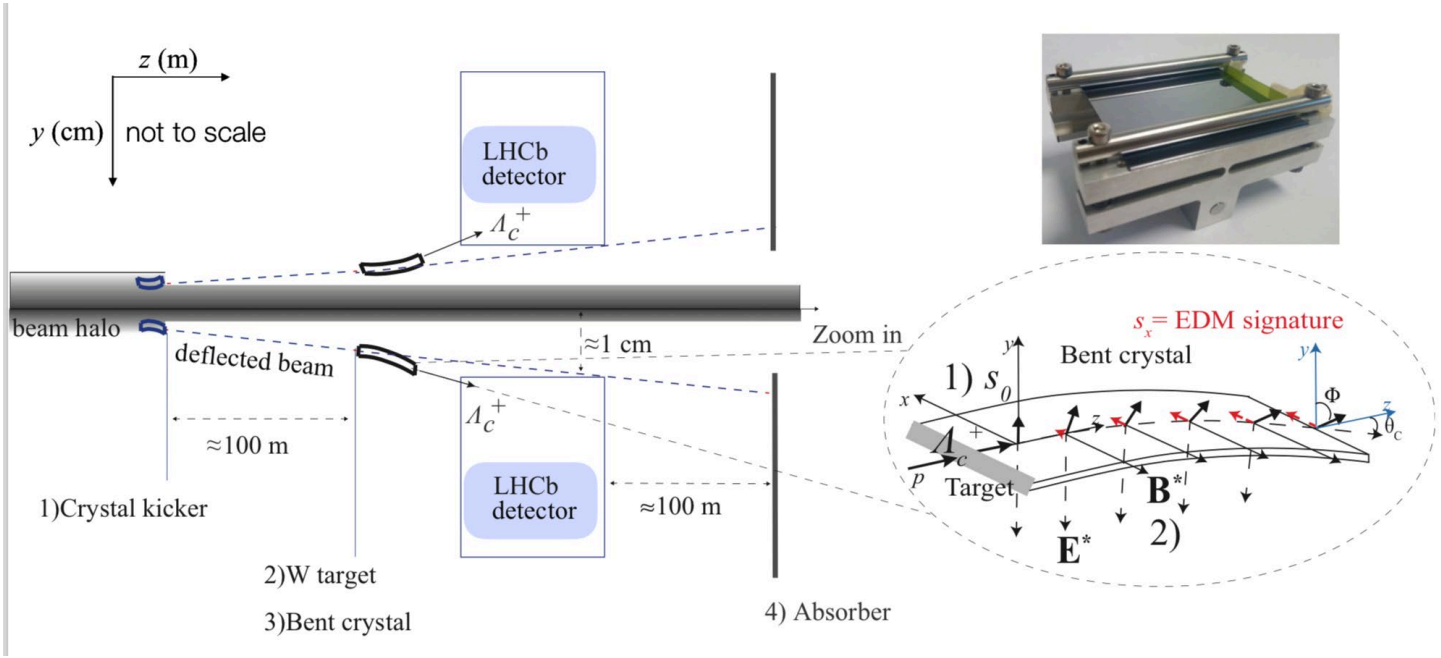
- Need to investigate the crystalline and amorphous target performances in collaboration with LAL Orsay (Paris, France).

- Monte Carlo simulation suited for future electron positron colliders (linear and circular) and muon collider (in collaboration with M. Antonelli and LNF group).

- Further experimental investigation at DESY (Hamburg, Germany) and SLAC (Stanford, California –USA).

Second thesis proposal

Measurement of MDM/EDM from spin precession of channeled baryons in bent crystals



Need to study a beam extraction scheme for the LHC (in collaboration with CERN)

Ref. Nicola Neri (Milano) Gianluca Cavoto (Roma)