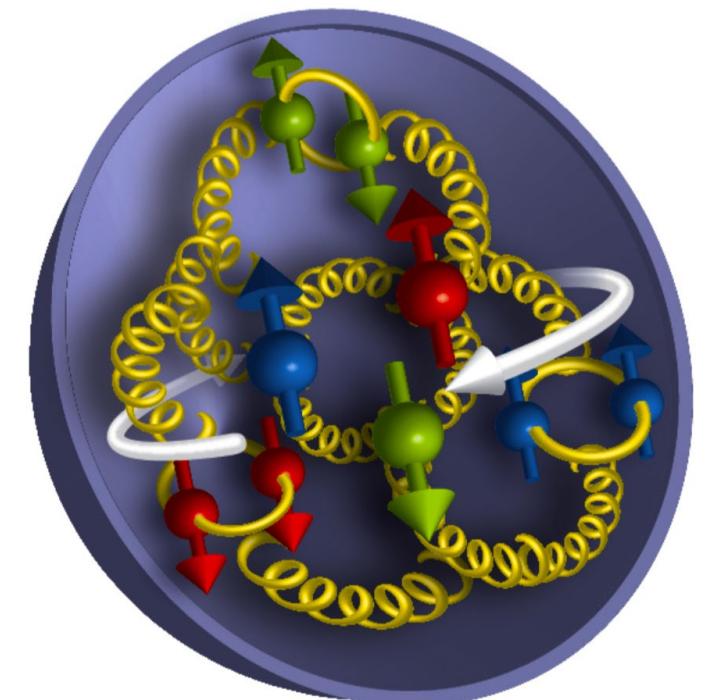


Bent Crystals for Investigation of Charmed Baryons Electromagnetic Dipole

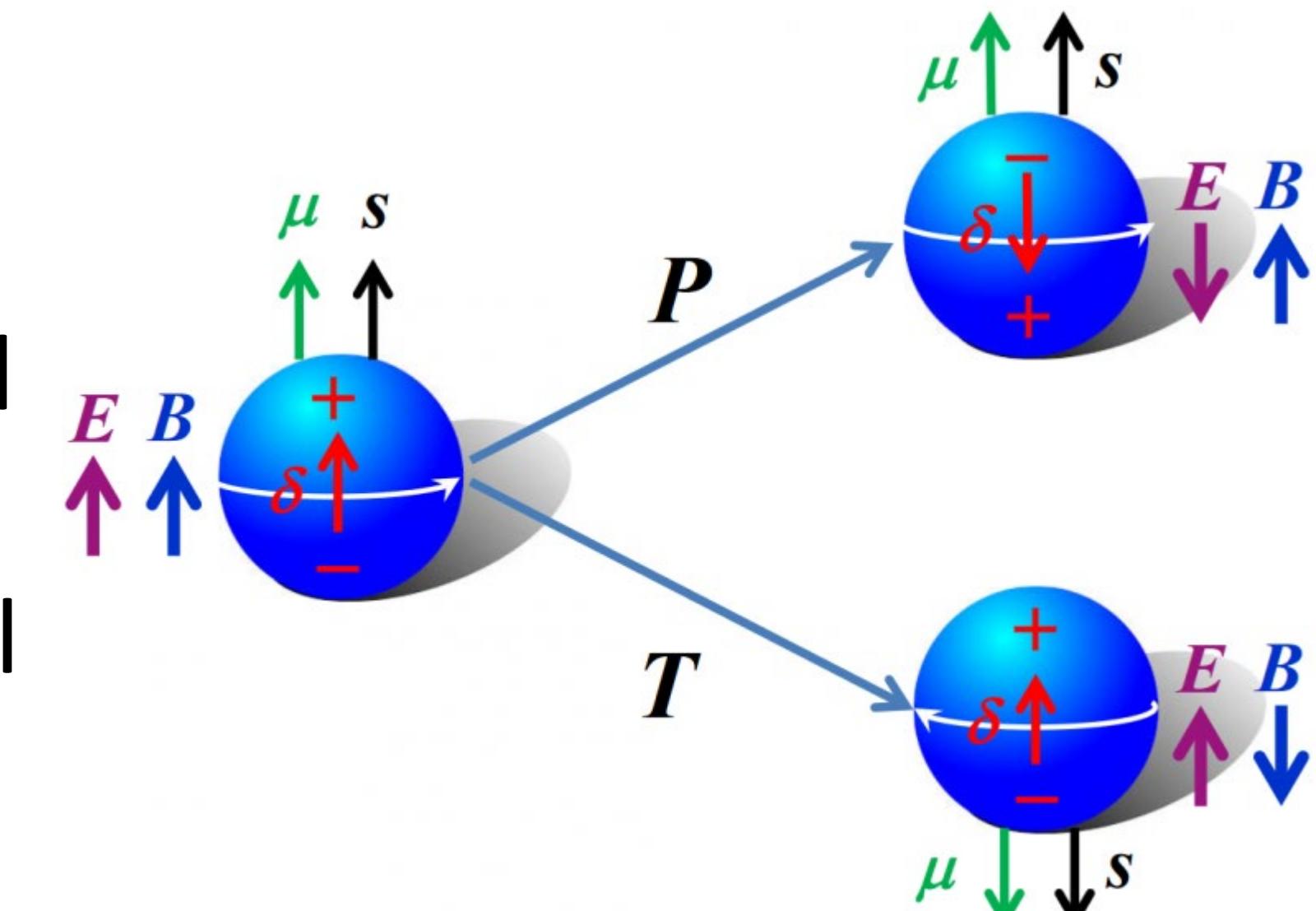
CONSOLIDATOR GRANT SELDOM GA 771642

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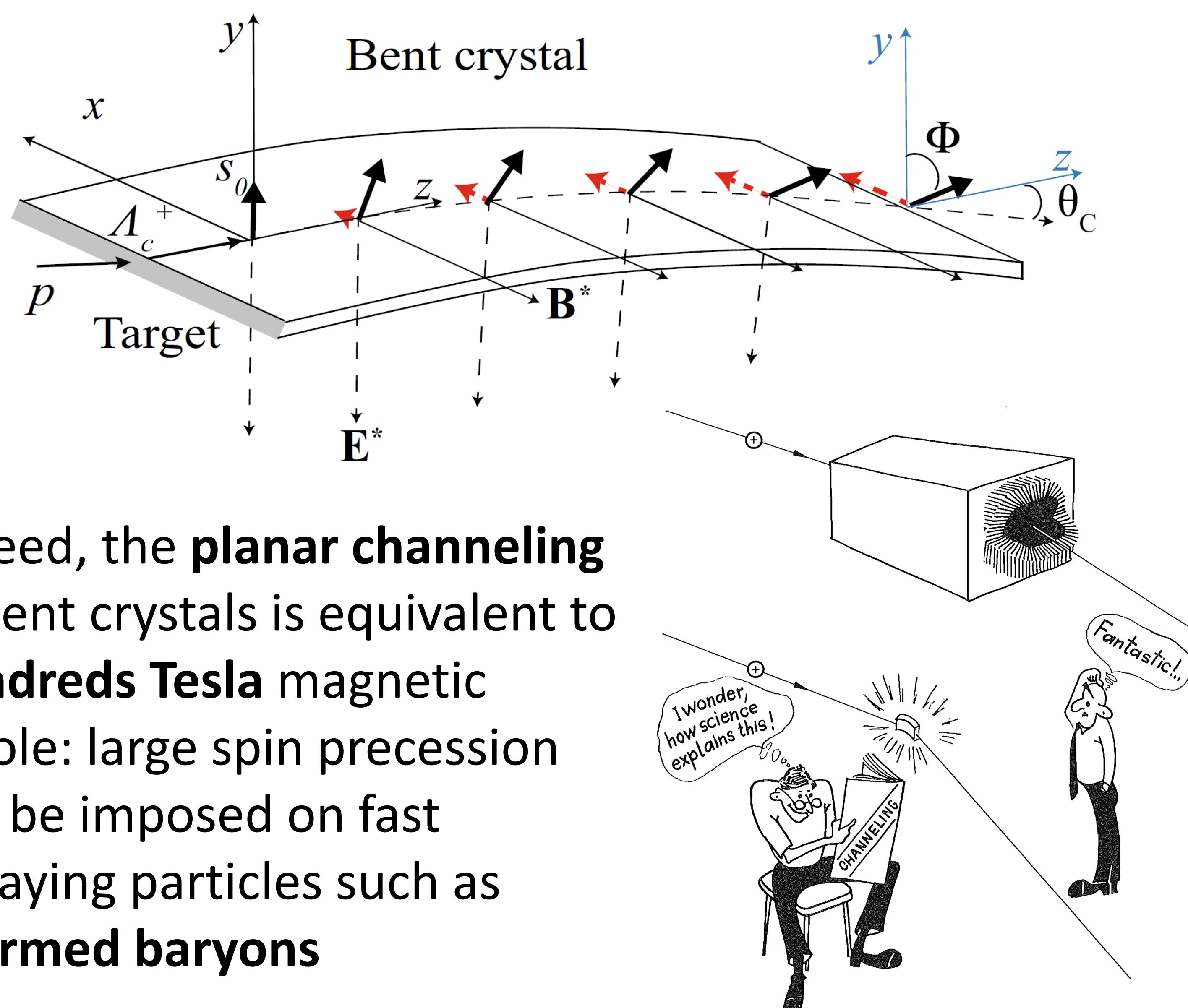
Electric Dipole Moment (EDM) violate CP : powerful probe for **new physics** beyond the standard model



Magnetic Dipole Moment (MDM) can be a probe for **internal structure of baryons**

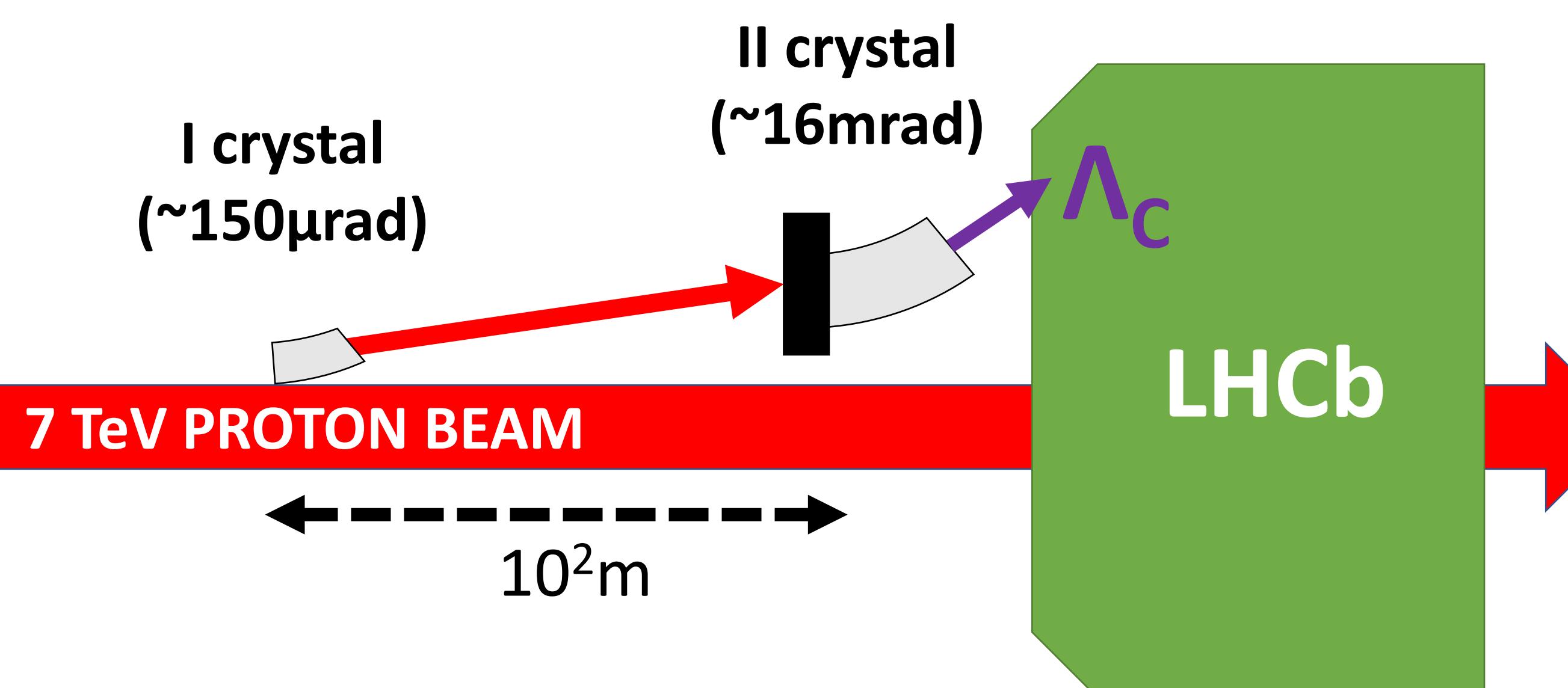


EDM & MDM can be measured via **spin precession** in magnetic fields, BUT spin precession occurs for particle channeled between atomic planes in a **bent crystals** as well!

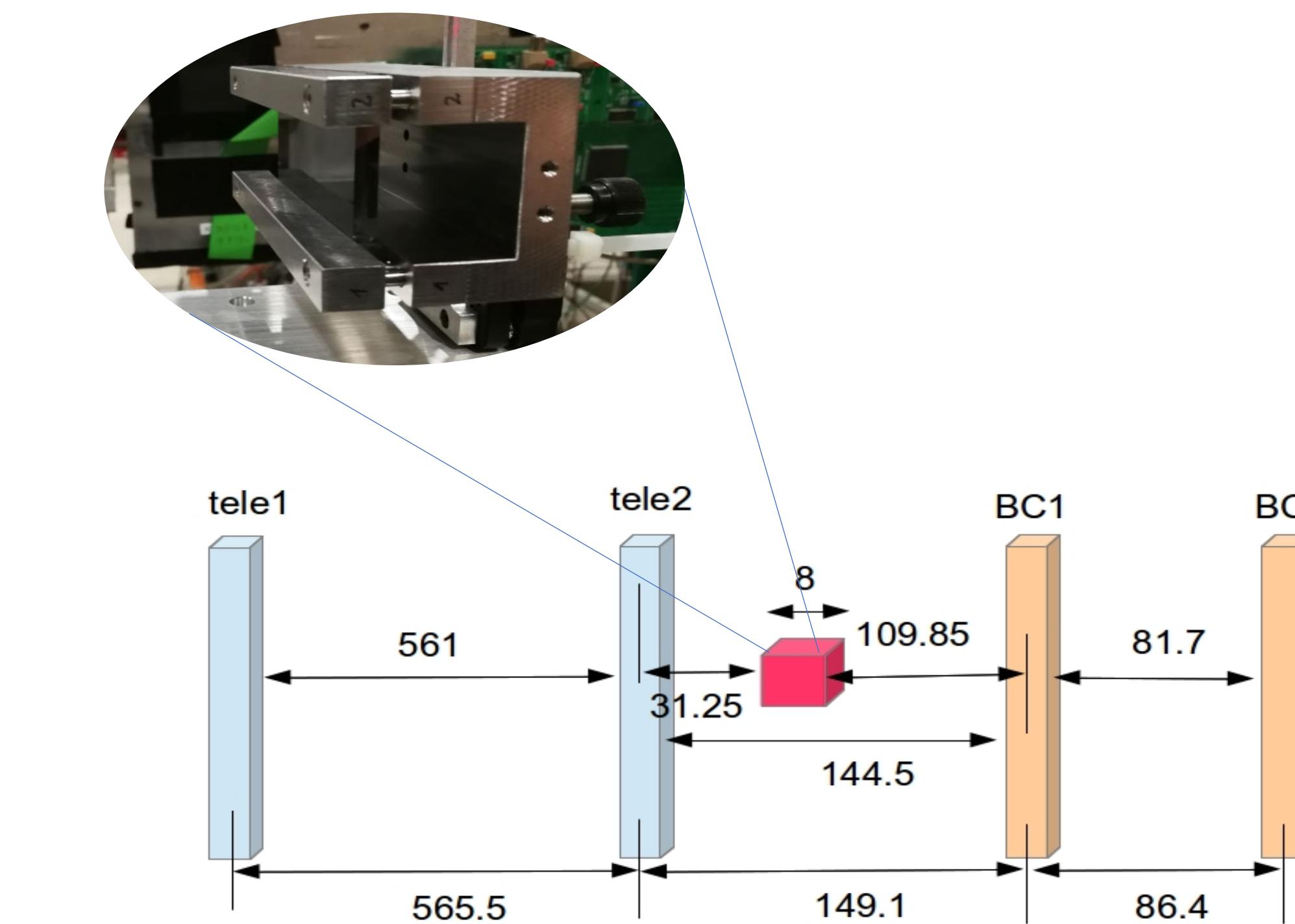


Indeed, the **planar channeling** in bent crystals is equivalent to **hundreds Tesla** magnetic dipole: large spin precession can be imposed on fast decaying particles such as **charmed baryons**

SELDOM double crystal proposed setup for EDM & MDM measure of Λ_C^+ and Ξ_C^+ at LHCb:

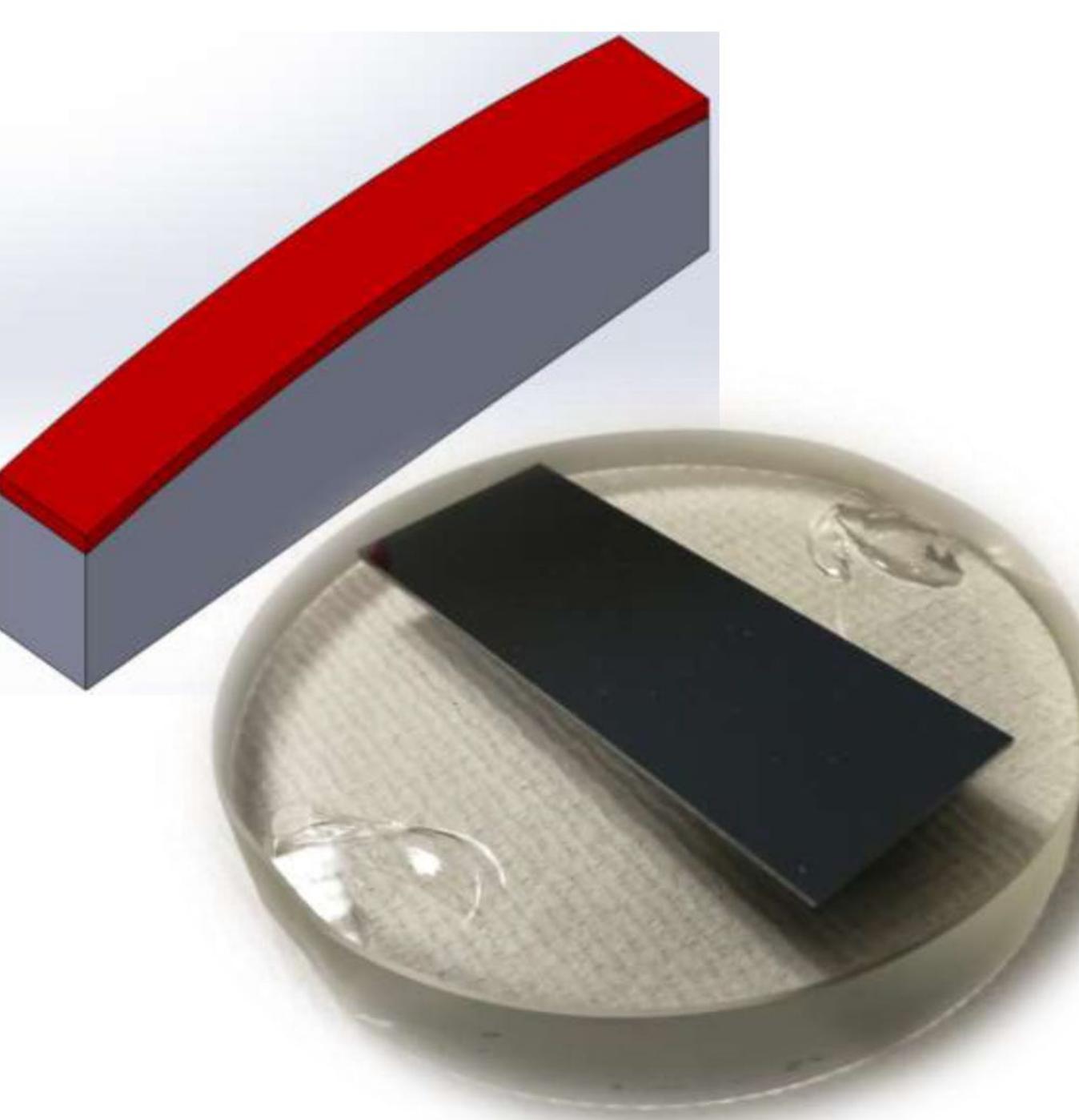
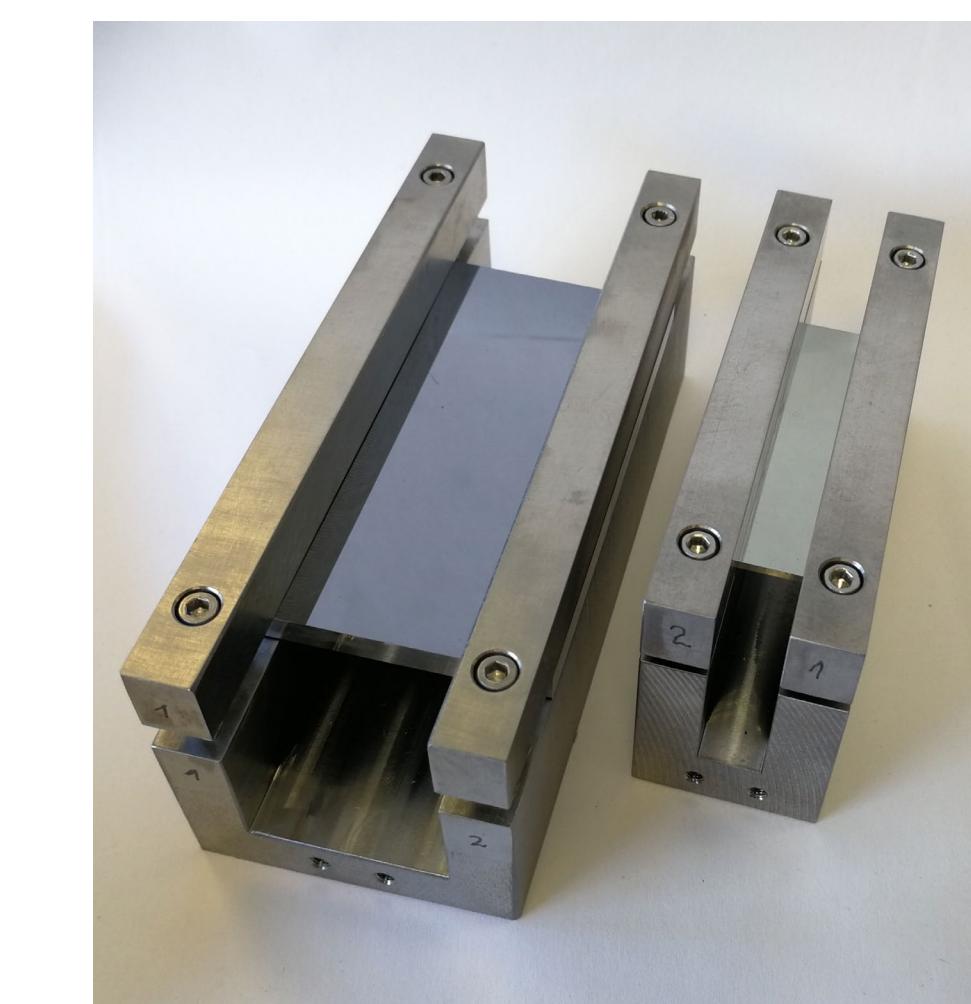


the first crystal collects particle from beam halo onto a target to Λ_C^+ and Ξ_C^+ , the second crystal imposes spin precession

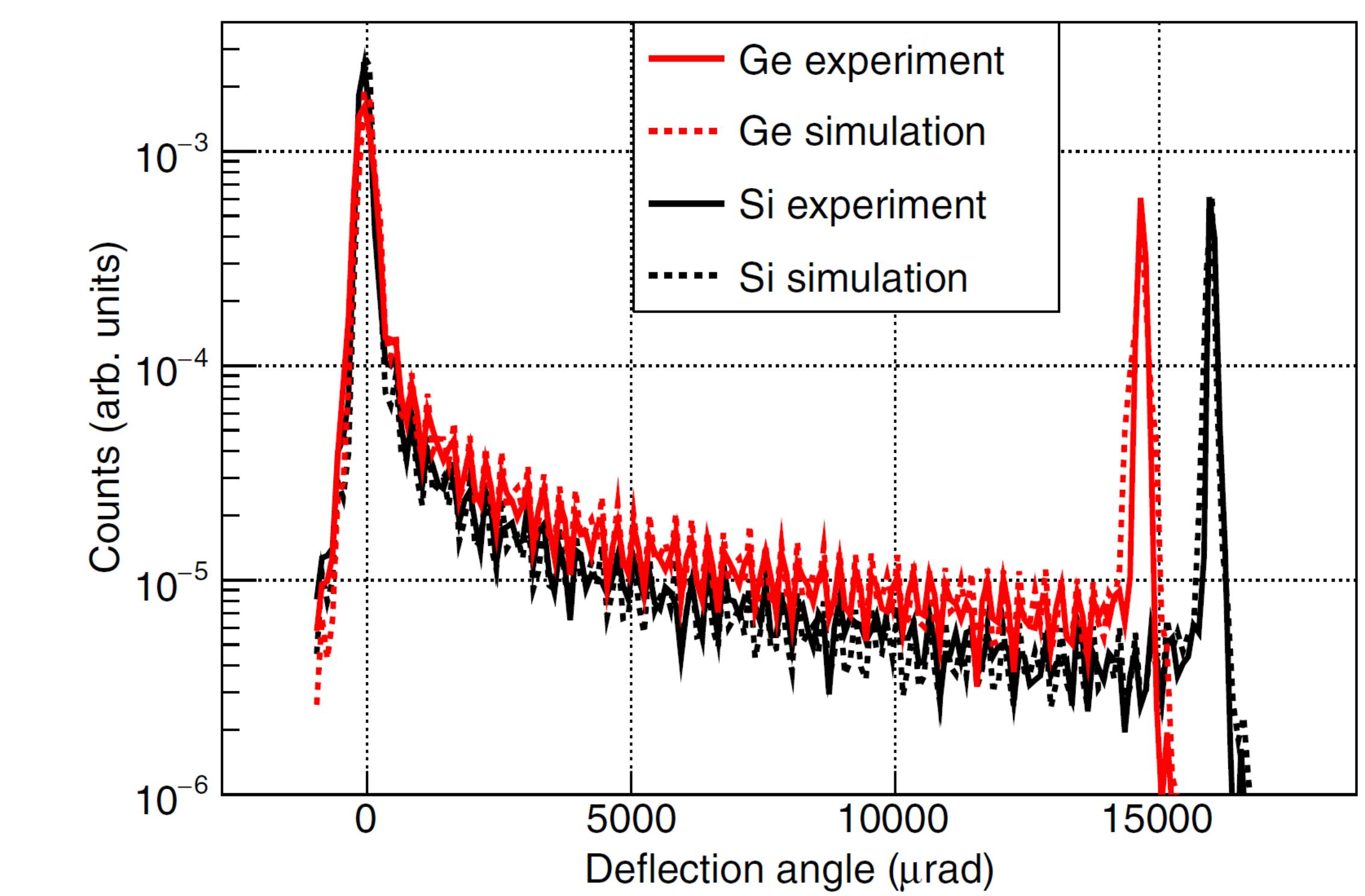


One Silicon and one Germanium bent crystal were tested on H8 beamline of CERN with **180 GeV positive pions beam**.

First generation of bent crystal for spin precession: **metal holder** clamp flat crystal plate on curved surfaces to cause bending. Tested at H8 beamline at CERN



New generation: crystal is **directly bonded** on curved substrate. Such technology is critical for operation at cryogenic temperature which could enhance crystal efficiency



Each trajectory was tracked: particle channeled between lattice planes follows the crystal curvature and are deflected. This allows to measure the **channeling efficiency**