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Observation of channeling for 6500 GeV/c protons in the crystal assisted collimation setup for LHC

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Two high-accuracy goniometers equipped with two bent silicon crystals were installed in the betatron cleaning insertion of the CERN Large Hadron Collider (LHC) during its long shutdown. First beam tests were recently performed at the LHC with 450 GeV/c and 6500 GeV/c stored proton beams to investigate the feasibility of beam halo collimation assisted by bent crystals. For the first time channeling of 6500 GeV/c protons was observed in a particle accelerator. A strong reduction of beam losses due to nuclear inelastic interactions in the aligned crystal in comparison with its amorphous orientation was detected. The loss reduction value was about 24. Thus, the results show that deflection of particles by a bent crystal due to channeling is effective for this record particle energy. The experimental results reported were obtained in the frame of UA9 experiment in CERN.

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