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“Crystal Calorimetry” for the FCC and HE-LHC

Recently a start for the 100 TeV p-p Future circular collider (FCC) project was given. Earlier a proton energy increase up to $33/2$ TeV began to be studied in the framework of the high-energy phase of the LHC upgrade. The energies of the secondary e^\pm and γ will reach many TeVs in the high pseudorapidity regions at both FCC and HE-LHC. The point is that these e^\pm , γ energies are high enough to give rise to the drastic increase of the e^+e^- pair production and hard γ -emission probabilities in oriented crystals related with their synchrotron-like mechanism. The development rate of electromagnetic showers will increase and the length decrease, accordingly, allowing to devise principally new electromagnetic calorimeters (ECAL) of reduced length. The radiation cooling phenomenon will also pronounsly manifest itself at such energies, additionally accelerating shower development and allowing to discriminate e^+ , e^- and γ .

Primary author: Prof. TIKHOMIROV, Viktor (Research Institute for Nuclear Problems)

Presenter: Prof. TIKHOMIROV, Viktor (Research Institute for Nuclear Problems)