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GEANT4 Simulation of Electromagnetic Shower Development in Oriented Crystals

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We present the details of the modification of GEANT4 cross-sections for bremsstrahlung and electron-positron pair production in case of particle moving along the strongest PWO crystal axes. The scaling coefficients for cross-section modification depend on particle energy and have been previously calculated through the direct integration of Baier-Katkov formula. We used the modified GEANT4 to build up simulations of electromagnetic shower propagation in oriented PWO crystals, demonstrating the strong electromagnetic shower length reduction in comparison with standard GEANT4 simulation in amorphous PWO. This GEANT4 package can be the base for modeling of e.m. shower in oriented crystals.

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