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A Novel Python Tool for Analyzing Geant4 Simulations: Enhancing Understanding of Particle Channeling in Crystals

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We present a novel Python tool for the analysis of Geant4 simulations that enhances our understanding of coherent phenomena occurring during the interaction of charged particles with crystal planes. This tool compares the total energy of particles with the potential energy inside crystal channels, enabling a complete examination of coherent effects. By tracking and tagging the dynamics of each simulation step, it provides deeper insights into how different phenomena contribute to both radiation and particle deflection. Applicable to both curved and straight crystals, this tool can play a key role in improving crystal-based extraction methods and the development of gamma-ray sources using crystals.

References

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