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DMG4: a fully GEANT4-compatible package for the simulation of Dark Matter

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The search of New Physics through Dark Sectors is an exciting possibility to explain, among others, the origin of Dark Matter (DM). Within this context, the sensitivity study of a given experiment is a key point in estimating its potential for discovery. In this contribution we present the fully GEANT4-compatible Monte Carlo simulation package for production and propagation of DM particles, DMG4. In particular, we discuss the implementation of production cross-sections in its GEANT4-independent sub-package, DarkMatter, and DMG4 latest release, including a finer application programming interface (API) to GEANT4. We also cover its recent developments with faster and more accurate cross-sections computations, sampling methods, extended energy range, as well as the expansion of the package to $B - L$ and semi-visible models. We finally discuss the improvements in the simulations of New Physics processes specific to muon beams.

Significance

References

https://www.sciencedirect.com/science/article/abs/pii/S0010465521002411?via%3Dihub

Experiment context, if any

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