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Fully Geant4 compatible package for the simulation of Dark Matter in fixed target experiments

We present the package for the simulation of DM (Dark Matter) particles in fixed target experiments. The most convenient way
of this simulation (and the only possible way in the case of beam-dump) is to simulate it in the framework of the
Monte-Carlo program performing the particle tracing in the experimental setup.
The Geant4 toolkit framework was chosen as the most popular and versatile solution nowadays.

Specifically, the package includes the codes for the simulation of the processes of DM particles production via electron and muon bremsstrahlung
off nuclei, resonant in-flight positron annihilation on atomic electrons and gamma to ALP (axion-like particles) conversion on nuclei.
Four types of DM mediator particles are considered: vector, scalar, pseudoscalar and axial vector.
The total cross sections of bremsstrahlung processes are calculated numerically at exact tree level (ETL).

The code handles both the case of invisible DM decay and of visible decays into e^+e^- ($\mu^+\mu^-$ for Z', $\gamma\gamma$ for ALP).

The proposed extension implements native Geant4 application programming interfaces (API) designed for these needs and can be unobtrusively
embedded into the existing applications.

As an example of its usage, we discuss the results obtained from the simulation of a typical active beam-dump experiment.
We consider 5×10^{12} 100 GeV electrons impinging on a lead/plastic heterogeneous calorimeter playing a role of an active
thick target. The expected sensitivity of the experiment to the four types of DM mediator particles mentioned above is then derived.

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