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# A New Monte-Carlo Code System for Particles Transport

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Particles Through Matter (or PTM for short) is a new Monte-Carlo C++ code system, under development by us. The PTM is intended to be a general purpose Monte-Carlo code, simulating all types of particles and their interactions with matter. The current version is still in an early stage of development, although a minimum stuff of electromagnetic interactions is already done, covering a wide energy range from low to high energies (at least collider energy scale). For electron/positron, a minimal package of physical processes is done, e.g., energy loss, bremsstrahlung, ionization, coulomb scattering (single and multiple) and the annihilation for the positron. For photons, the photoelectric effect, Rayleigh and Compton scattering and pair production are implemented with different models. The PENELOPE option is implemented for both electron/positron and photons aside with the standard option. Optical photon and its processes is implemented too, enabling performing simulations of even complex optical systems, e.g., refractive and reflective telescopes. Fresnel lenses which present complex shapes of the surface are taken into account. Further, a minimal functioning package for neutrino propagation and interaction (roughly implemented) through matter with matter effect is done, with three active neutrino scheme and three active plus one sterile neutrino. More details about the design of the code with some validation tests will be presented and discussed through this contribution.

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