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Complete Monte Carlo simulation of the optical response of the WArP detector for direct Dark Matter search

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WArP is a double phase Dark Matter experiment using Liquid Argon as a target. In order to efficiently collect the 128 nm scintillation light a very careful light collection system, made by a wavelength shifter and a dielectric mirror, is used. A detailed & complete GEANT4 simulation of the detector has been performed, from particle interaction to PMTs photon detection. Optical photons tracking as well as wavelength shifting and boundary optical processes on the light collection system surface have been implemented. A dedicated C++ code, simulating the electronics and DAQ systems, has been also used to obtain WArP like data starting from the PMTs photon hits.

Are you a Memeber of the Geant4 Collaboration (yes/no)

no

Keymords

Dark Matter, Optical Photon, Boundary Processes

Summary

A GEANT4 simulation of the 100 liter WArP detector has been performed. Scintillation properties as well as tracking of optical photons and boundary processes have been implemented. DAQ and electronics response have been taken into account by means of a dedicated C++ code. Simulated signals have been used to test WArP analysis softwares.

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