

# GEANT4 models for muonic atom processes, including ionization, isotopic transfer, spin-flip, fusion, and proposed simulation package.

Friday 19 July 2024 15:21 (17 minutes)

The dMu/DT collaboration plans to measure the  $\mu\text{CF}$  rate and sticking fraction at temperatures  $\sim 10^3\text{K}$  and pressure  $\sim 10^5$  bar using a diamond anvil cell with D-T mixture. In parallel, physics processes related to formation, transport, transfer, and other deexcitations of muonic atoms, as well as  $\mu\text{CF}$  and reactivation of muons to the fusion cycles are being modeled in GEANT4. Although atomic capture and the formation of muonic atom exist in the recent source distributions it's not part of a standard Physics list. The authors are working towards adding the above processes and modified EM processes to act on muonic atoms. These models are being validated with archival data from DD and DT  $\mu\text{CF}$  experiments and theoretical calculations across different groups. The proposed package was presented in the Geant4 Hadronic Physics group meeting, and we are submitting it for inclusion in GEANT4 as part of the muonic atom package in the 2024 release.

## Alternate track

1. Technology Applications and Industrial Opportunities

## I read the instructions above

Yes

**Author:** Dr TRIPATHY, Sridhar (UC Davis)

**Co-authors:** Dr KNAIAN, Ara (NK Labs, LLC); Prof. LYNCH, Kevin Richard

**Presenter:** Dr TRIPATHY, Sridhar (UC Davis)

**Session Classification:** Detectors for Future Facilities, R&D, Novel Techniques

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