

Requirements, Development Plans, and Requests

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Detector Developments and Resulting Simulation Requirements

TU Darmstadt is participating in Detector development for X-ray astronomy (ATHENA) with in orbit background estimates and ground based low background experiments (CAST)

- We have heritage of previous missions (SIMBOL-X, IXO) to compare with
- This requires simulation consistency for different G4 versions as simulations are too time intensive to be redone with every version

Main requirements for low energy physics in Geant4

- Photon interactions
- Electron scattering and energy loss
- Atomic de-excitation
- PIXE
- Radioactive decay and long term activation
- Metastable isotopes
- Geometries with thin ($< \mu\text{m}$) layers close to detectors

Development Plans

- We have joined a international group in diverse fields with similar physics requirements in Geant4
- This group is actively improving all Geant4 physics relevant for our needs
- We are implementing a radioactive decay simulation with enhanced capabilities and updated data sets
 - Long term activation
 - Activation build up
 - Radioactive materials
 - Modular, easily adaptable to user needs
 - Up to date data sets
 - Flexible database backend

Requests

Geant4 EM working group has plans to remove the current low energy extensions, which they consider “obsolete”, from future Geant4 versions

Our requests

- Keep Livermore based low energy processes in future releases
- If these processes can not be maintained by the G4 working group, move them to pii package instead so that they can be maintained by our collaborators