Problem Statement for GEANT4-GPU

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Description of Problem
GEANT-4 is a widely-used simulation program used to simulate particle interactions. There are currently several members of McMaster's Engineering Physics department that use the program, and are being limited by the performance of the software. This means that they cannot simulate particle interactions that take place over the course of minutes (or even seconds), and they also can't simulate large numbers of particles.

Increasing the runtime of the simulation or the number of particles would greatly increase the accuracy of their results, allowing the researchers to understand the systems they're modeling better. This is especially true when modeling complex systems, such as McMaster's nuclear reactor. Depending upon the level of success of the project, the solution could potentially benefit groups that use GEANT-4 outside of McMaster as well.

Stakeholders
The engineering physics researchers (graduate students) that proposed the GEANT-4 to GPU project are big beneficiaries of the project. The supervisor of the graduate students, Dr. Buijs is the other big stakeholder in the project. If the project is extremely successful, and if an application to CERN about GEANT-4 collaboration is voted in, CERN and other users of GEANT-4 could become stakeholders as well.

Context & Environment