Master Thesis Project
Radioactive concrete - the true story revealed!

The Gustaf Werner Cyclotron at The Svedberg Laboratory

Project description

The Svedberg Laboratory (TSL) is an accelerator laboratory at Uppsala University. Some of the research activities at TSL are currently being decommissioned. A large part of this work concerns the determination of the type and amount of radioactivity of the objects and areas in the laboratory. These are identified through measurements. However, everything cannot be measured and therefore simulations are necessary in order to optimise the work.

The task of this master thesis project is to use the Monte Carlo code FLUKA to simulate radioactivity induced by fast neutrons in a concrete wall and to compare the results with experimental measurements. The work can be divided into the following parts:

1. Learn how to use FLUKA and to run the simulations on a computer cluster.
2. Simulate a defined reference volume in a concrete wall, and investigate effects due to
   • different geometries,
   • different neutron energies,
   • different material composition of concrete.
3. Simulate the reference volume with realistic neutron spectra.
4. Compare the simulations with experimental data available for the reference volume
5. Evaluation and recommendations.

Supervision, start date and contacts

Supervision on how to use FLUKA will be provided by the Applied Nuclear Physics group (supervisor: Mattias Lantz). Supervision on the analysis and comparison with experimental data will be provided by TSL (supervisor: Johan Nyberg). The start date of the project can be any time between November 2016 and March 2017. For further information, please contact Johan Nyberg, johan.nyberg@physics.uu.se, 070-4250504.