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# Helmholtz – CSC – Fellowships 2010

**Helmholtz Centre:** Research Centre Jülich – (www.fz-juelich.de/portal/home)

**Research Field:** Safety research for nuclear waste disposal

**Research Project:** Development of a method to improve the charaterization and quality assurance of radioactive waste by gamma-scanning

**Position:** PhD Student Sandwich PhD Student **X** Postdoc □

**Department/Supervising scientist:** Institute for Energy Research, Safety Research and Reactor Technology, IEF-6 / Dr. E. Mauerhofer

**Research Area:**

Radioactive waste must meet the specifications and acceptance criteria defined by national regulatory and management authorities for its intermediate and final storage. The characterization of radioactive waste is the first basic step necessary for its classification. The non-destructive determination of the isotope specific activity content in quality checking of radioactive waste drums is most widely performed by segmented gamma-scanning (SGS). Generally it is assumed that the matrix and the activity are uniformly distributed in each drum segment that is measured (calibration conditions). However, waste drums are often heterogeneous, and span a wide range of matrix composition and activity distribution. Thus SGS errors are mainly related to non-uniform measurements responses associated with unknown radioactive sources spatial distribution and matrix heterogeneity including internal shielding structures of unknown design.
In order to improve the reliability and accuracy of activity results in SGS of radioactive waste drums exhibiting non-uniform isotope and density distributions a method based on numerical simulations of the measured angular dependent count rate during drum rotation will be developed. The method will be validated through the measurement of test drums and real waste drum of well known composition.

**Specific Requirements:**

Bachelor or master's degree in physics, nuclear science or engineering with a minimum overall grade of "good"; experience in non-destructive techniques for radioactive waste characterization , gamma spectrometry and numerical simulation methods; a well-developed ability to work in a team and with international colleagues; ability to work independently.

**Work Place:** Research Centre Jülich, Germany (near Cologne)

**Earliest Start** (between September 2010 and February 2011)**:** September 2010

**Language Course:** A German language course will be offered parallel to the project

**Further Information:** e.mauerhofer@fz-juelich.de
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