EUROPEAN COMMISSION
DIRECTORATE GENERAL
JOINT RESEARCH CENTRE
Directorate R – Resources
Resource Management Karlsruhe

Project sheet reference number 2016-KRU-G-000-8009

Investigation of the thermal properties from Reactor graphite

Position for:	**Short description of activity:**
Trainee	As the science and knowledge service of the Commission, the mission of DG Joint Research Centre is to support EU policies with independent evidence throughout the whole policy cycle. The JRC is located in 5 Member States (Belgium, Germany, Italy, the Netherlands and Spain). Further information is available at: https://ec.europa.eu/jrc/ At JRC Karlsruhe a new inverse method was developed to investigate thermal properties at very high temperatures (up to the melting point) of nuclear fuels and other materials used in the reactor. The method is based on the laser-flash technique: a specimen is heated at the conditioning temperature by two laser beams, after reaching a constant temperature an additional pulse is applied at the front face in order to increase slightly the central temperature of the rear side (≈ 10 K). The temperature curve in function of time is compared to the theoretical curve from a finite element model describing the experiment. The unknown parameters, thermal conductivity, heat capacity or emissivity are determined by a fitting procedure. In this work, we propose to use this technique to determine the thermal properties of reactor graphite used in a wide temperature range: 500 – 3000 K. Reactor graphite is used as neutron moderator and the knowledge of its thermal and optical properties is of prime importance for the operators of the nuclear plant and for fuel performance codes which simulate normal, off-normal and accidental operating conditions. The trainee will have the opportunity, under the supervision of the traineeship advisor, to work with laser devices, radiation pyrometers, infrared camera and some advanced data acquisition devices and programs. We will also use FlexPDE as finite element tool and MATLAB to determine the unknown parameters. **Qualifications:** Essential The position is open to both the undergraduate and graduate levels. For undergraduates, please note that person should be studying at the university and preparing thesis. The thesis should match with the subject of the project call. - Knowledge in heat transfer. - Good command of English language, Level B2. Advantage - Finite element modelling.

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	For general eligibility requirements, please read the rules governing the traineeship scheme of the JRC: https://ec.europa.eu/jrc/en/working-with-us/jobs/temporary-positions/jrc-trainees
Institute/ Directorate Unit	JRC.G, Nuclear Safety and Security (Karlsruhe) JRC.G.I.3 Further information: https://ec.europa.eu/jrc/en/about/organisation https://ec.europa.eu/jrc/en/science-area/nuclear-safety-and-security
Indicative duration **Preferred starting date**	3 to 5 months 01/06/2017
JRC Site **Country**	Karlsruhe Germany
JRC contact details	**For any technical problems with your application, please contact:** JRC-ESRA@ec.europa.eu