UNIVERSITEIT GENT

SOETE LABORATORY

PhD studentship: Fatigue damage in fusion and GEN IV reactor steels: FEM modelling and experimental study

- **Last application date:** 31st of March 2021
- **Department:** Soete Laboratory, Ghent University
- **Contract type:** Limited duration (48 months)
- **Starting date:** 1st of October 2021
- **Occupancy rate:** 100%
- **Vacancy type:** PhD Student - Research staff

Project description:

Development of materials and components for future nuclear installations requires early assessment of their operational endurance to ensure technical and financial justification of the exploitation. Many reactor components, such as cooling pipes in existing and future reactors (e.g. ITER, MYRRHA), will inevitably be exposed to low cycle fatigue (LCF) loads. The components operating at high temperature, in addition, will experience creep deformation which might interact with the fatigue behaviour.

This PhD project incorporates a combined study by applying finite element method (FEM) and experimental mechanical testing with a primary purpose of assessing the fatigue and creep-fatigue damage in most common steels for the application in future power installations exploiting fusion and fission nuclear reactions.

The FEM tool will be elaborated on the basis of the currently available models, developed for industrial high temperature steels, but will account for the effect of neutron irradiation – unavoidable damage present in the nuclear operational environment. The mechanical test programme will be executed in support of the model development and validation in the premises of Belgian Nuclear Research Centre. The project will be embedded in the broad frame of the European fusion programme (www.euro-fusion.org/) as well as it will have intensive interactions with the team qualifying the materials for MYRRHA reactor (https://myrrha.be/).

Profile:

- Master of sciences , Master of sciences in engineering.
- Familiar with Finite Element Analysis (ABAQUS).
- Familiar with experimental mechanical testing.
- Fluent in English and programming languages.

Scholarship Salary:

The salary of PhD scholarship at Ghent University is competitive and depends on, a.o., the researcher's family situation.

Applications:

Please email your CV with the contact details of two references and a letter of motivation explaining your vision regarding the research topic to:
Professor Magd Abdel Wahab by email: Magd.AbdelWahab@UGent.be
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