

Cycle of studies: (Bachelor LT)

Degree course: Energy engineering, Materials engineering, Chemical Engineering, Chemistry

Title of the thesis: Water chemistry definition for power plants cooling circuits and irradiation damage on materials

Type: experimental/modelling

RFX Supervisor: Claudia Gasparrini

Academic supervisor: Prof. Piergiorgio Sonato

Head of the RFX research group: Andrea Rizzolo

Leader of the RFX research program: Mauro Dalla Palma

Description of the thesis:

The inside of a nuclear fission or fusion reactor is one of the most hostile environment a material can experience. The coolant circuit of a light water reactor or a water cooled fusion reactor is exposed to a high level of ionising radiation and neutron damage, leading to transmutation of elements in the base metal and irradiation damage of materials that affects the performance of the coolant itself. For example, when exposed to high energy ionising radiation or neutron damage, water decomposes into a range of radiolytic species and the material is subjected to changes in the microstructure and chemical composition. During this thesis you will get an opportunity to research the effect that irradiation have on the materials used inside nuclear reactors using some modelling codes. Experimental work will be developed to test corrosion of irradiated specimens to research irradiation induced/enhanced corrosion.

Previous experience (if necessary): basic programming skills

Date: 28/09/22

Status: (assigned/available)

Name of the student: (when assigned)