

# WINTER SCHOOL 2021

## Modeling of the behaviour of materials under irradiation

PARIS, Société Géologique de France  
77 Rue Claude Bernard  
NOVEMBER 16-19 2021

MAITER



### SCOPE AND OBJECTIVE

The European NOMATEN project, launched at the end of 2019, aims to support the structuring and scientific influence of the NOMATEN Center of Excellence (CoE) dedicated to multifunctional materials for industrial and medical applications, created in Poland at the end of 2018.

In order to support the training of new generations of young Polish researchers (education programme) and to boost the growth of the NOMATEN CoE and its capacity to implement and manage research programmes, the first Winter School has been proposed. Organized by CEA, the first edition of the school is related to material sciences and takes place in Paris. Its agenda focuses on modeling and simulation of the behaviour of materials under irradiation - also confronted with experimental approaches.

NOMATEN Winter School is designed for PhD, post-doctoral students and researchers with a priority for NOMATEN and NCBJ, VTT, CEA as well. Lasting four days, the school includes two sessions (1st day) dedicated to reminders and/or upgrades in the form of courses given by experts from CEA and VTT but also from NOMATEN CoE. Another two sessions (2nd & 3rd days) are dedicated to scientific communications from CEA, VTT and NOMATEN/NCBJ researchers. Additionally, two poster sessions will take place as well as the last day will be devoted to visits at selected CEA Saclay facilities.

### SCIENTIFIC COMMITTEE



Jean-Luc Béchade, Christophe Gallé,  
Frédéric Dollé, Gilles Moutiers



Mikko Alava, Paweł Sobkowicz,  
Jacek Jagielski, Jacek Gajewski,  
Marcin Brykała

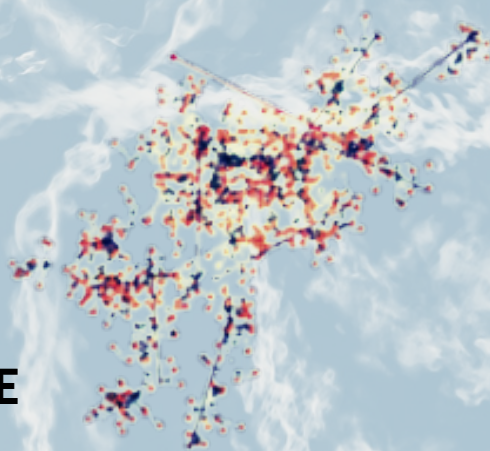


Maria Oksa

### ORGANIZING COMMITTEE



Christophe Gallé, Christine Prouilhac,  
Jean-Luc Béchade, Frédéric Dollé,  
Gilles Moutiers





# PRELIMINARY PROGRAMME

## WINTER SCHOOL PARIS 2021

### Thursday NOV 16th 2021: Lectures

#### Session 1

- Primary damage, point defects formation-migration-properties, cascades (Jean-Paul CROCOMBETTE, CEA)
- Thermodynamics, diffusion and phase stability under irradiation (Maylise NASTAR, CEA)

#### Session 2

- Plasticity at atomic scale, dislocations motion, irradiation defects interactions (Emmanuel CLOUET, CEA)
- Nanoindentation and irradiated materials: technique, applications, results (Łukasz KURPASKA, NOMATEN/NCBJ)
- SAFIR BRUTE project - Barsebäck RPV material used for true of embrittlement evaluation (Pentti ARFFMAN, VTT)

### Wednesday NOV 17th 2021: Communications

#### Sessions 3

- Frenkel pair accumulation in the molecular dynamics framework to study irradiation effects (Alain CHARTIER, CEA)
- Modelling irradiated materials: from Molecular Dynamics to Nanoindentation (Javier DOMINGUEZ, NOMATEN/NCBJ)
- Interatomic potentials optimisation or crystalline defects determination using Machine Learning technics (Cosmin MARINICA, CEA)
- Materials Informatics of High Entropy Alloys (Stefanos PAPANIKOLAOU, NOMATEN, NCBJ)

#### Session 4

- Application of Calphad method (Zr base alloys, carbides etc.) (Caroline TOFFOLON, CEA)
- Solute effects on the microstructural evolution of nickel base alloys as model alloy of austenitic steels (Marie LOYER-PROST, CEA)
- Nanoindentation of ion-irradiated materials and thin films (Łukasz KURPASKA, NOMATEN/NCBJ)
- Corrosion modelling : Ekinox models (Laure MARTINELLI, CEA)
- Modelling of weld microstructure effect on brittle fracture initiation (Noora HYTÖNEN, VTT)
- Replacement chemicals for hydrazine in PWR secondary side cycles (Konsta SIPILÄ, VTT)

#### Poster Session 1

Evening: Welcome Dinner

### Thursday NOV 18th 2021: Communications

#### Session 5

- Dislocation interactions with irradiation defect-loops in metals (Laurent DUPUY, CEA)
- Multiscale modelling of plasticity with discrete dislocation dynamics (Mikko ALAVA, NOMATEN/NCBJ)
- Impact of radiation damage on functional properties of Al coatings deposited via PLD technique (Agata ZABOROWSKA, NOMATEN/NCBJ)
- Polycrystalline modeling of the behavior of neutron-irradiated recrystallized Zr alloys during strain path change tests (Fabien ONIMUS, CEA)

#### Session 6

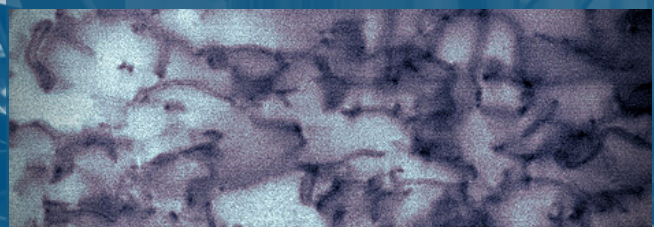
- Utilizing micromechanical modeling as part of the ICME workflow for irradiated materials (Matti LINDROOS, VTT)
- Interfaces, intergranular fracture prediction using multi-scale simulations (Laurent VAN BRUTZEL, CEA)
- Modelling of inhomogeneous fracture toughness behavior of irradiated reactor pressure vessel steels (Sebastian LINDQVIST, VTT)
- Fracture behavior of austenitic stainless steels used for Pressurized Water Reactors (PWR) internals structures (Jeremy HURE, CEA)
- Study and modelling of tritium trapping in fusion relevant materials (Etienne HODILLE, CEA)
- Unconventional application of microscopic techniques in analysis of irradiated materials (Iwona JÓŹWIK, NOMATEN/NCBJ)

#### Poster Session 2

### Friday NOV 19th 2021

#### Visits to facilities at CEA Saclay

- LECI hot laboratory
- SCBM hot laboratories
- JANNuS ion irradiation platform



# WINTER SCHOOL

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