



**GHENT
UNIVERSITY**

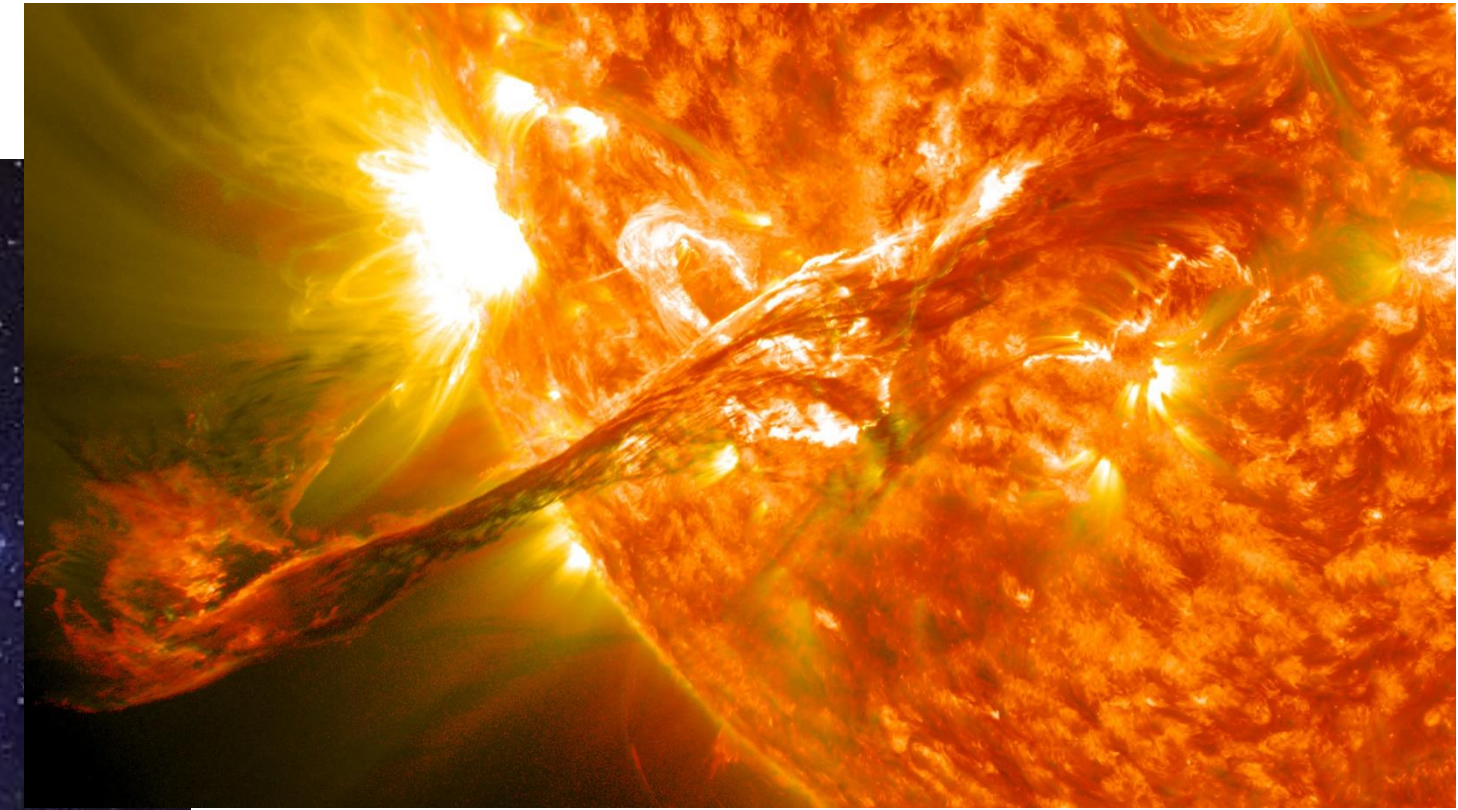
MASTER THESIS TOPICS

NUCLEAR FUSION

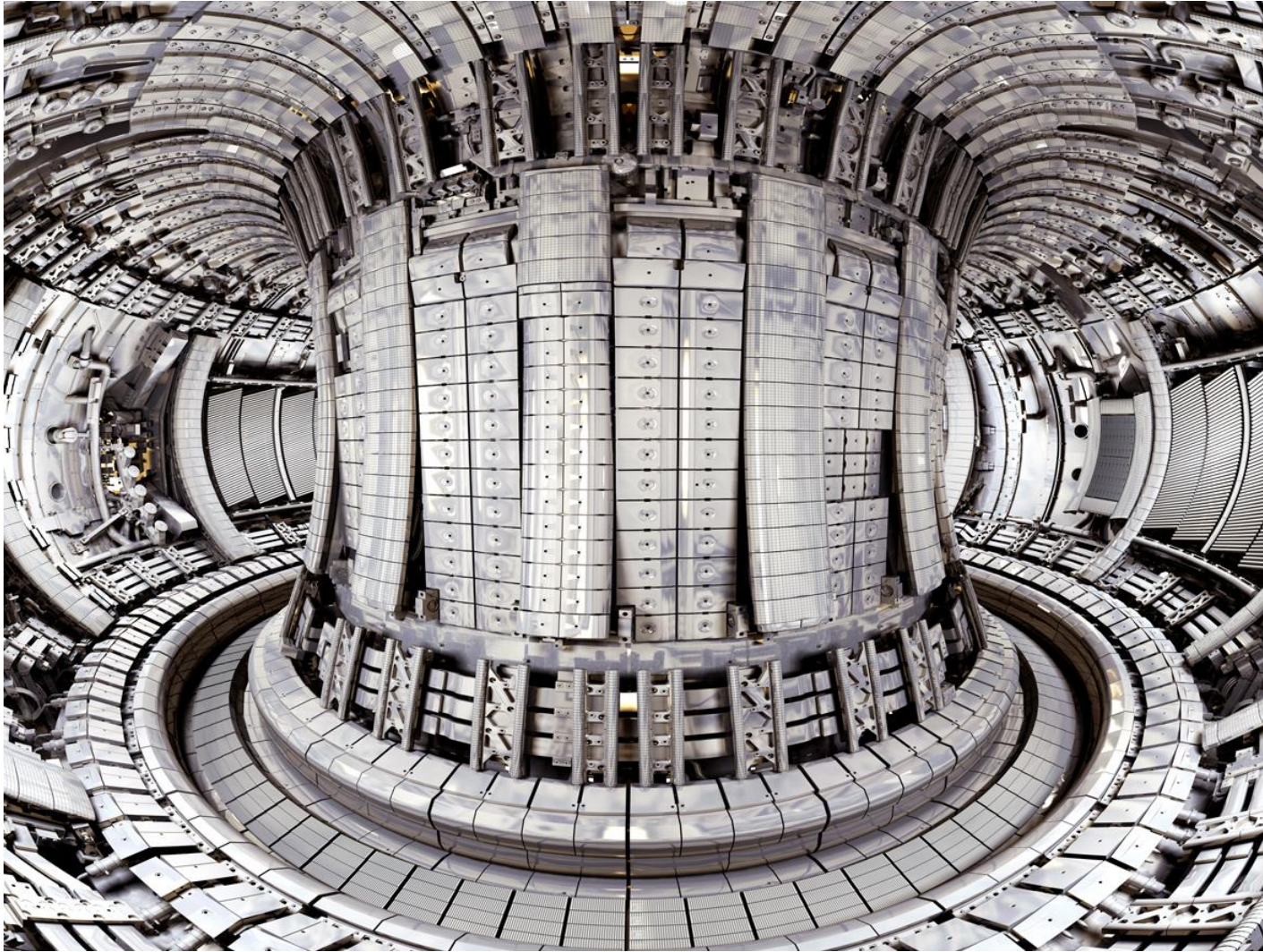
Prof. Dr. Geert Verdoolaege

NUCLEAR FUSION

NUCLEAR FUSION IN NATURE

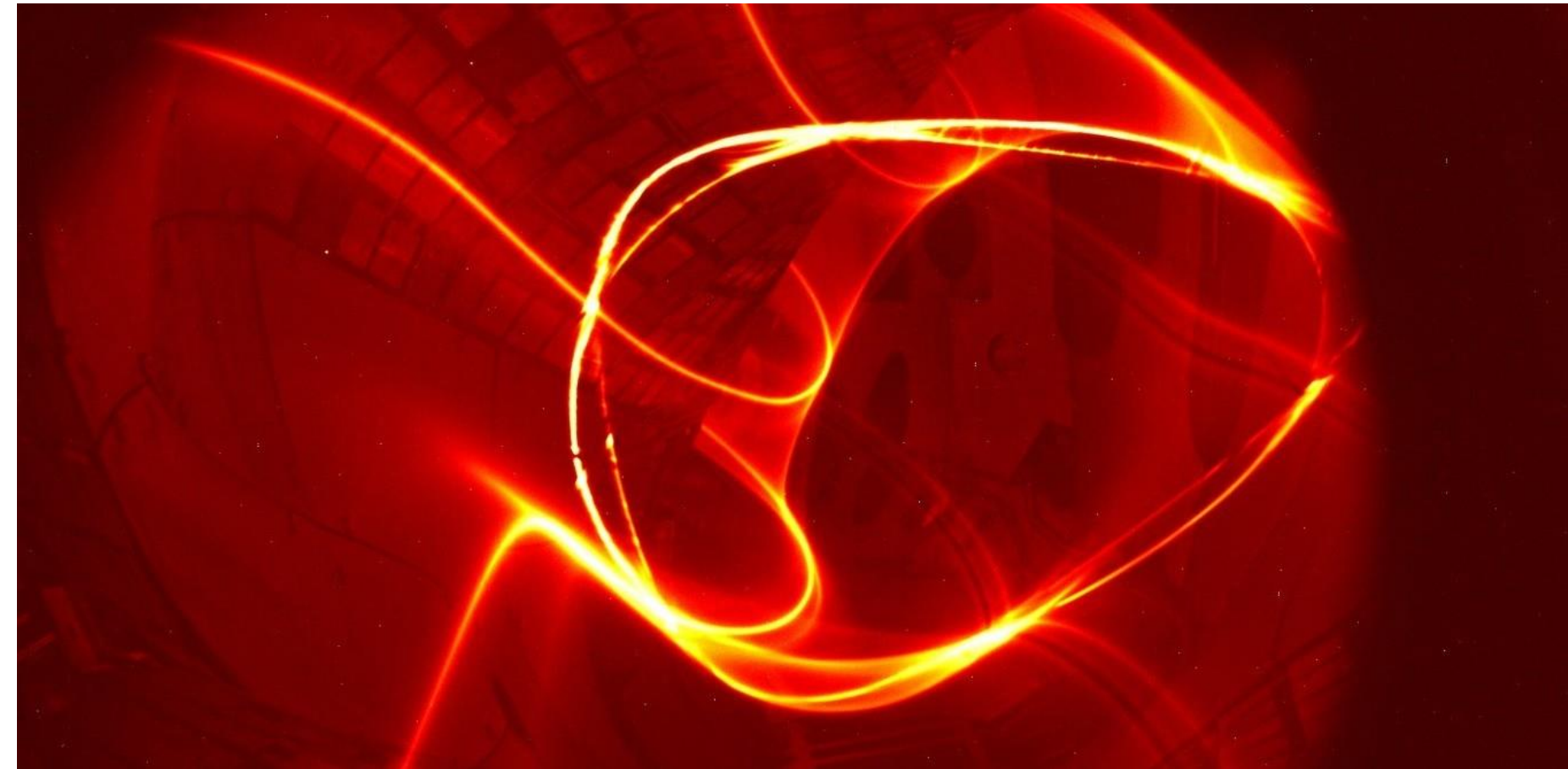


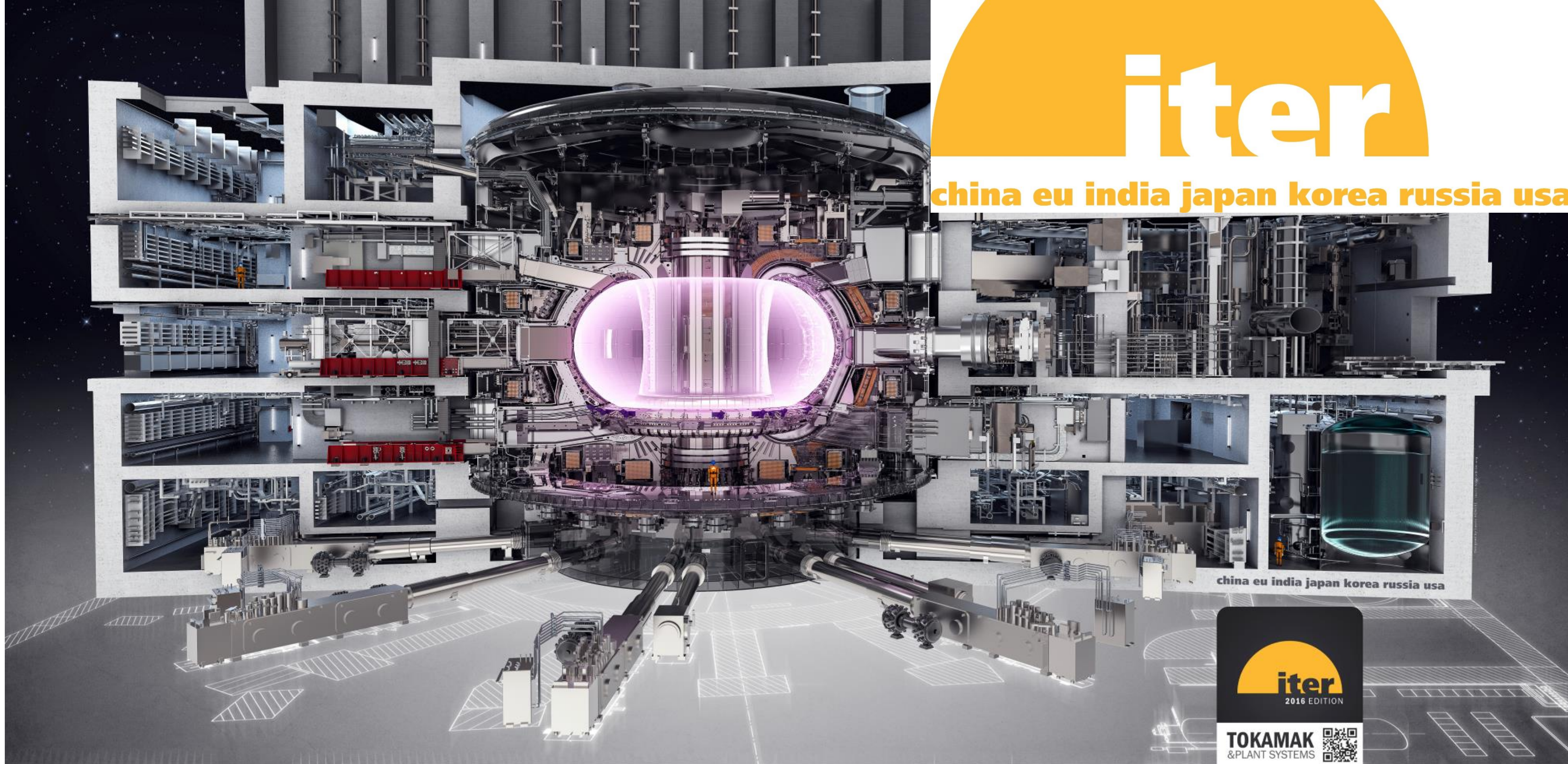
... AND IN THE LAB



Tokamak

Stellarator

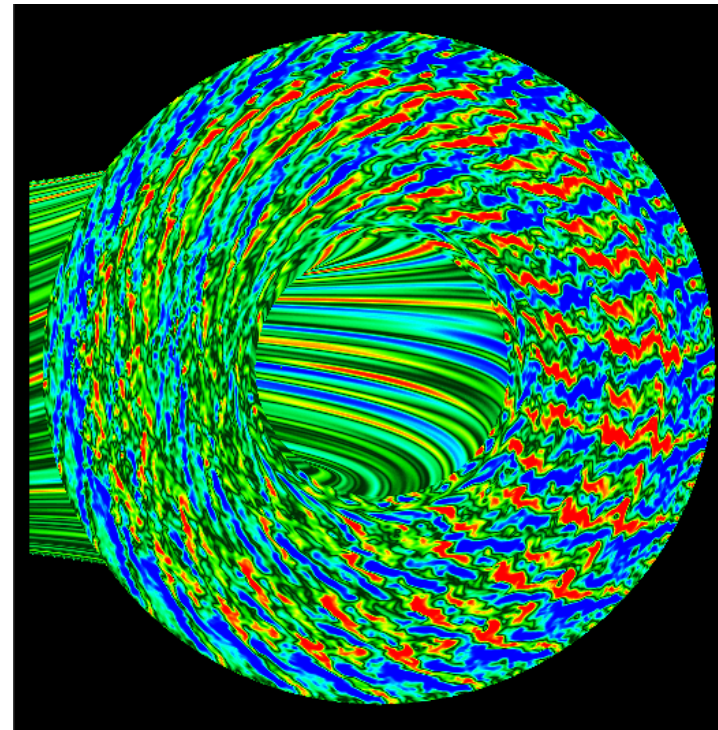
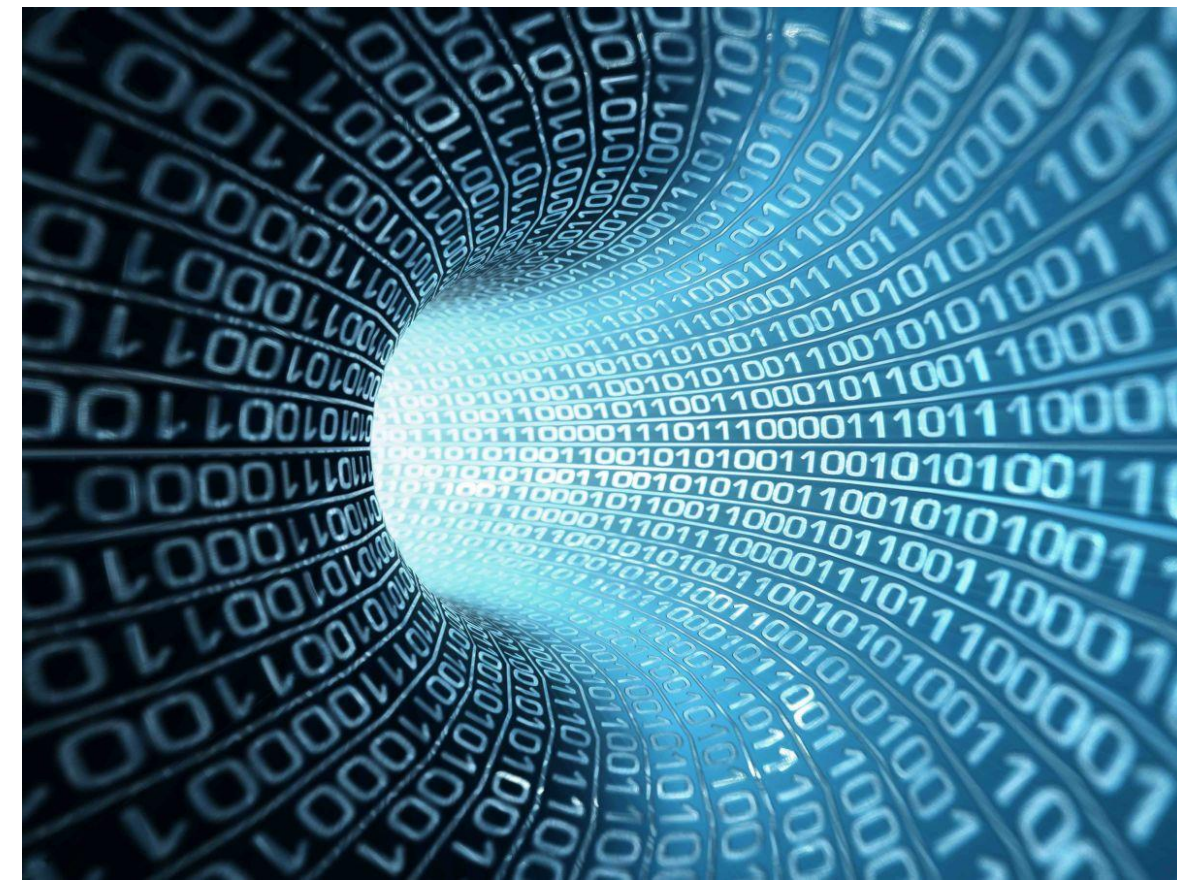




FUSION DATA SCIENCE

FUSION DATA SCIENCE

- Data science methods in fusion
- Interdisciplinary field
 - Bayesian probability theory
 - Machine learning
 - Information geometry
- Numerous applications!



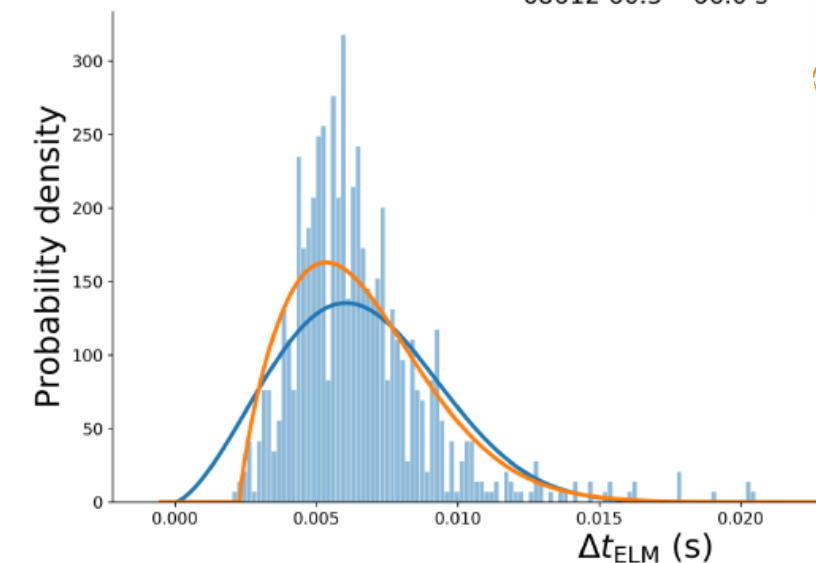
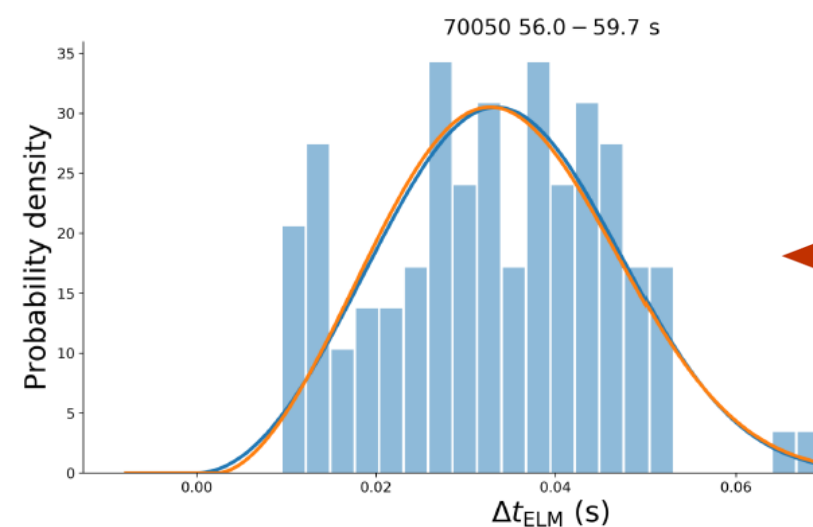
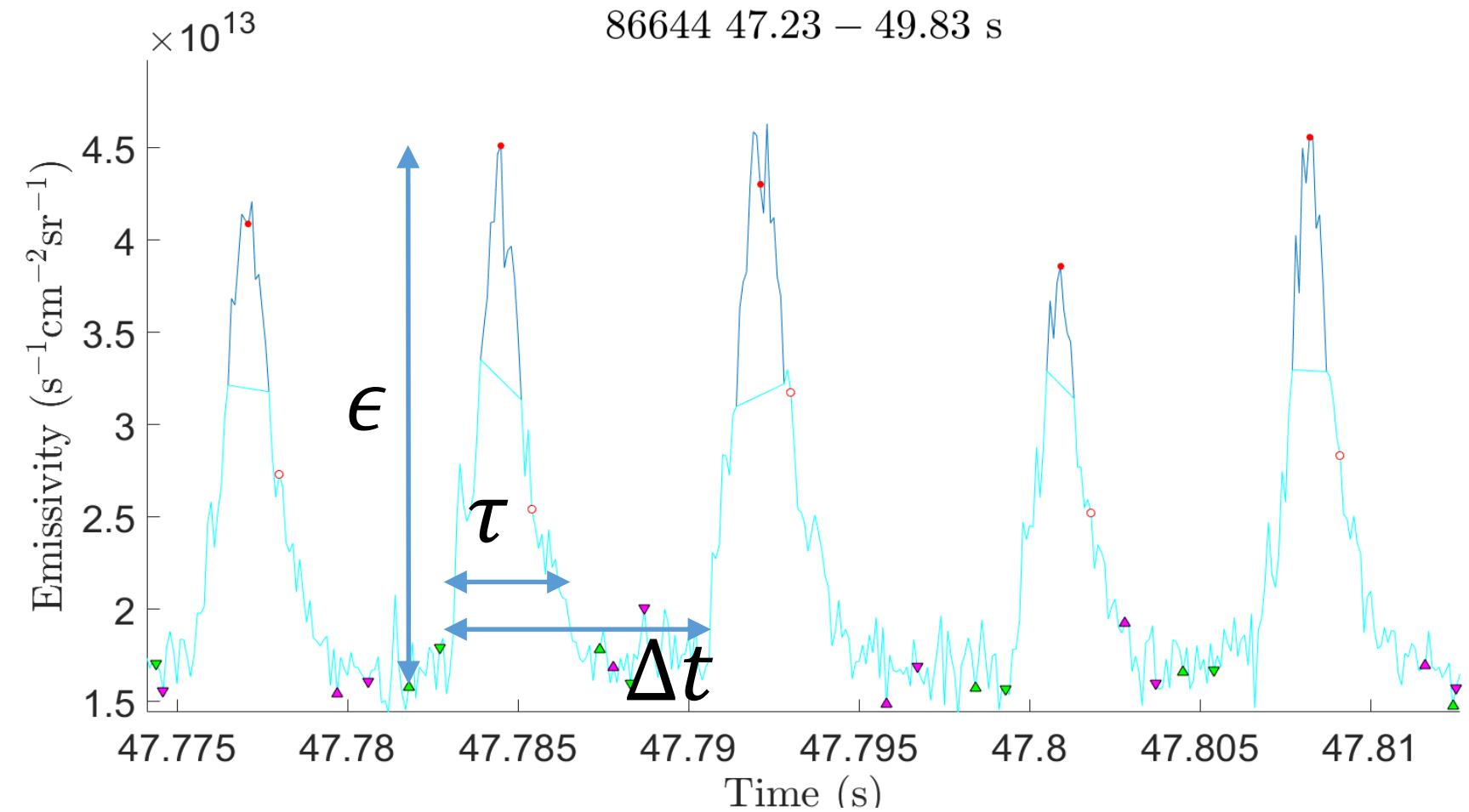
TOPIC 1

Probabilistic study of edge-localized instabilities in the JET tokamak

Promoter: Geert Verdoolaege

Supervisors: Jerome Alhage and Geert Verdoolaege

Location: Technicum



CCFE
CULHAM CENTRE FOR
FUSION ENERGY

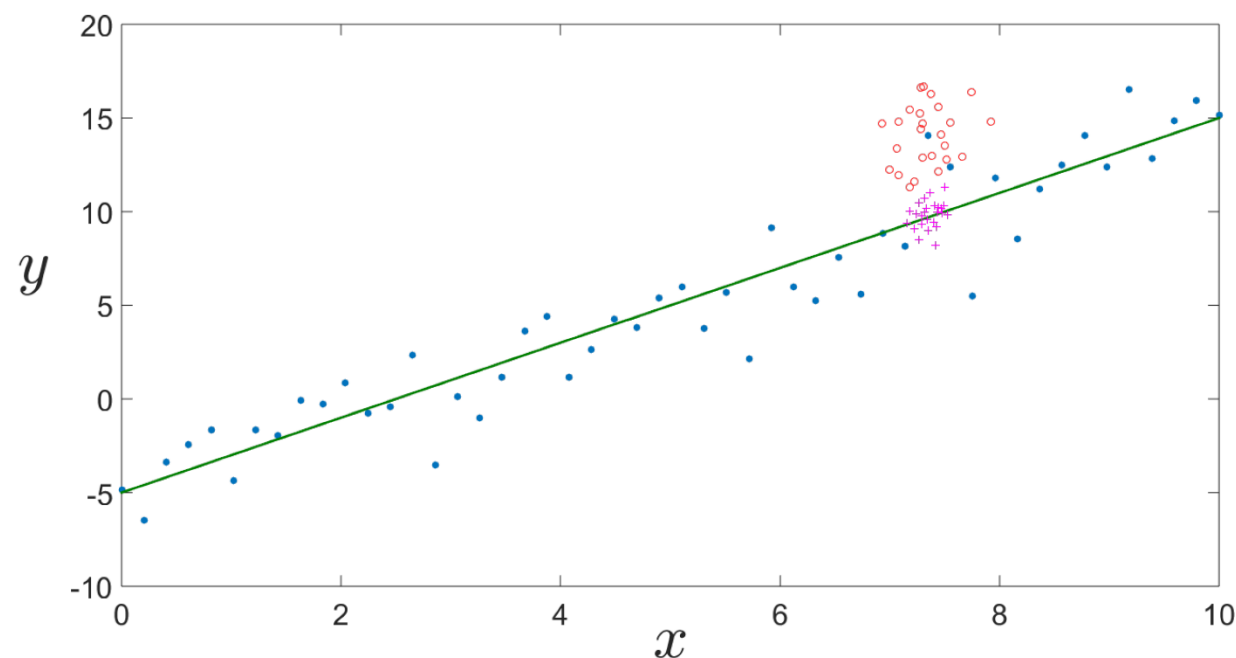
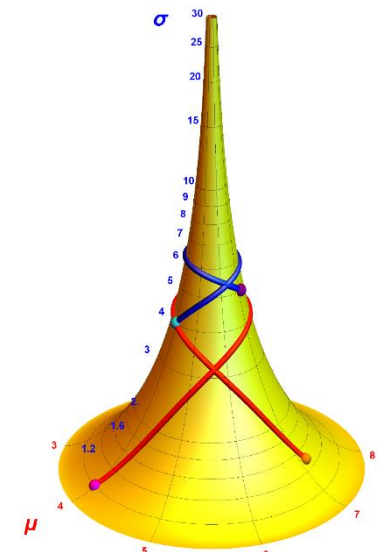
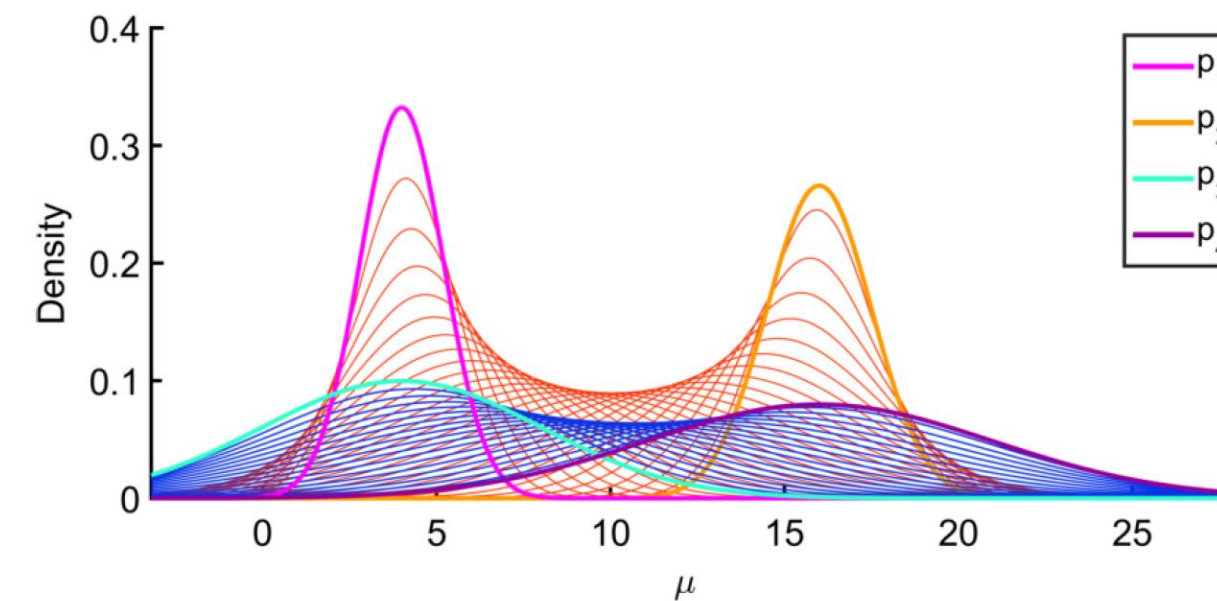
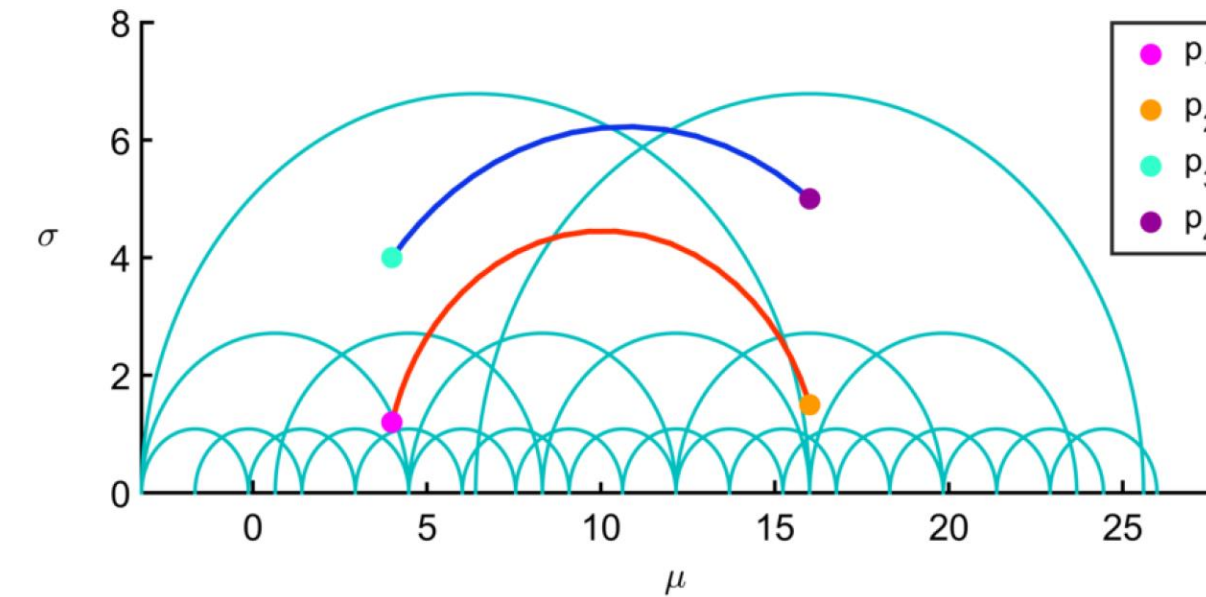
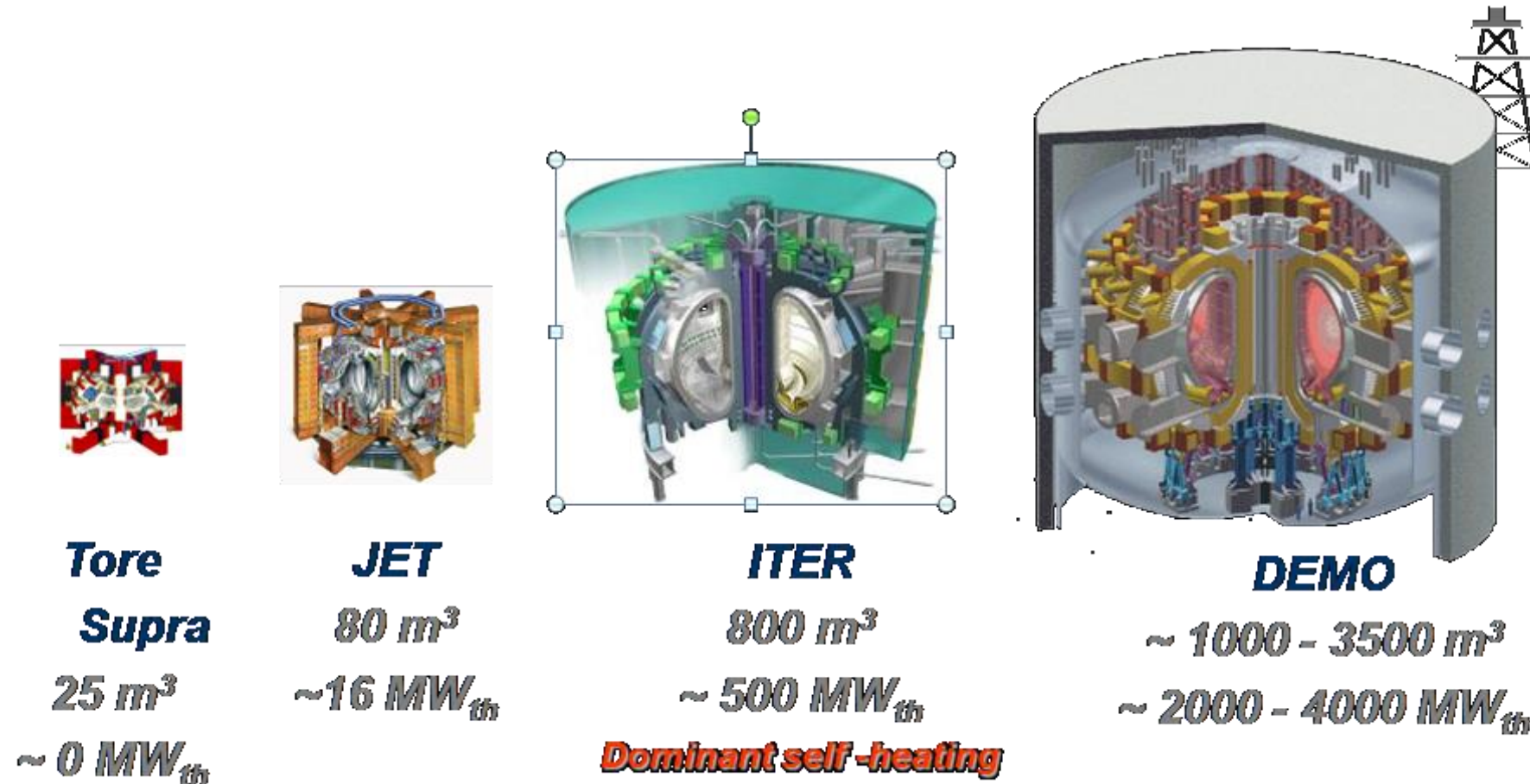


UK Atomic
Energy
Authority

TOPIC 2

Prediction of plasma energy confinement for ITER using advanced regression techniques

Promoter: Geert Verdoolaege
Supervisors: Joseph Hall and Geert Verdoolaege
Location: Technicum



TOPIC 3

Survival analysis of first-wall components under thermal loads in a fusion reactor

Promoters: Wolfgang Biel and Geert Verdoolaege
Supervisors: Leonardo Caputo and Geert Verdoolaege
Location: Technicum

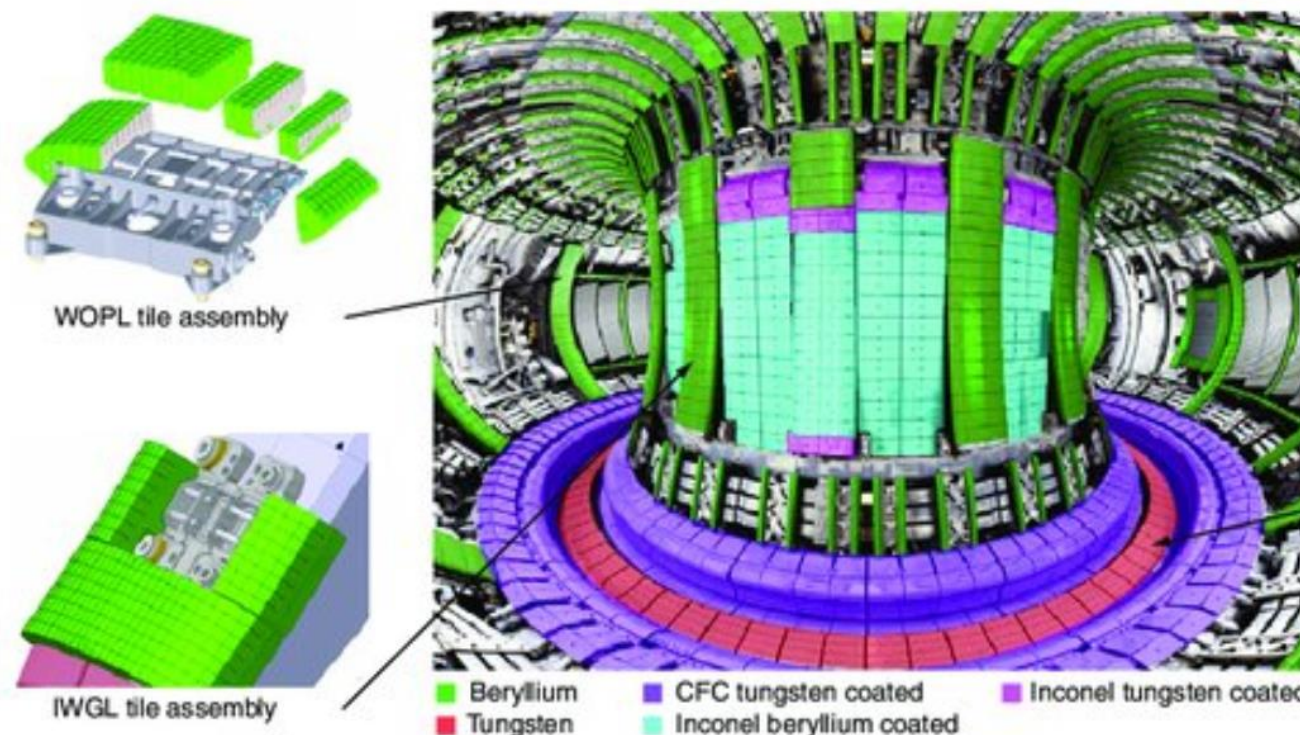
POTENTIAL
UPSIDE


**REACTIVE
MAINTENANCE**
Run-until-failure


**PREVENTIVE
MAINTENANCE**
Planned maintenance


**PREDICTIVE
MAINTENANCE 4.0**
*Failure prediction
using IoT & big data*

COMPLEXITY →

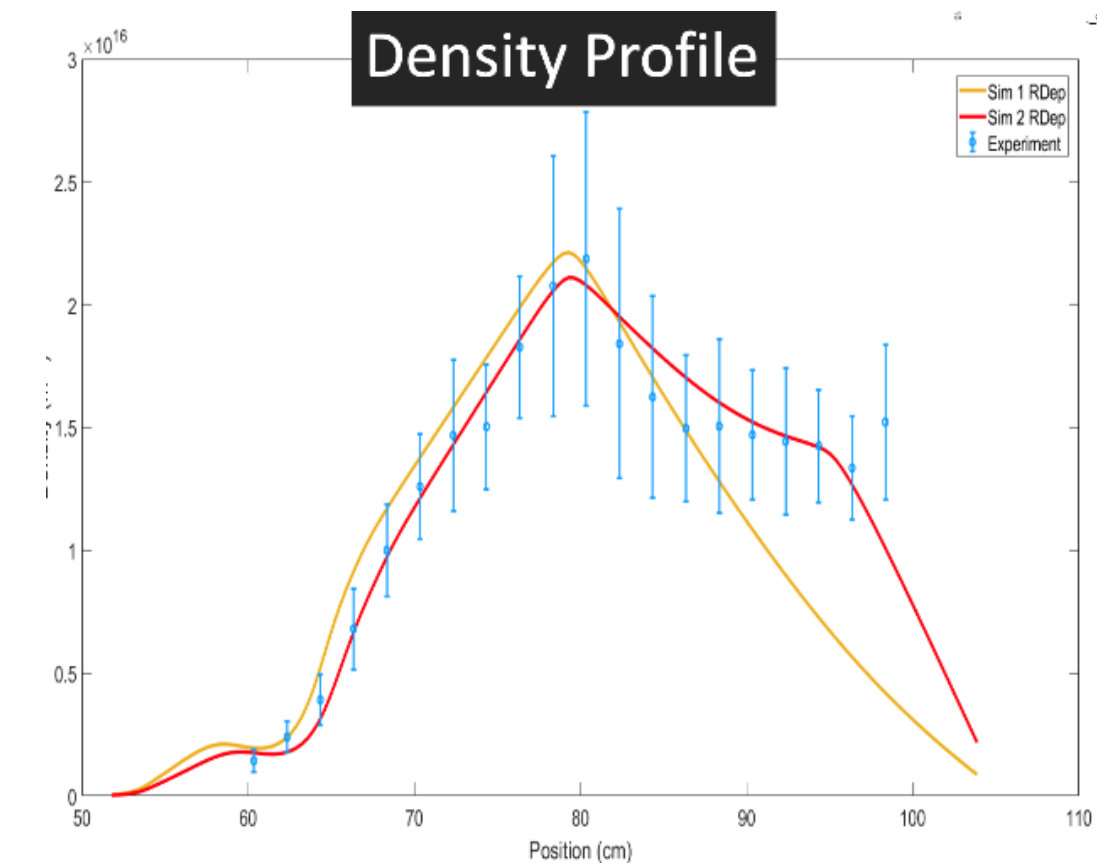
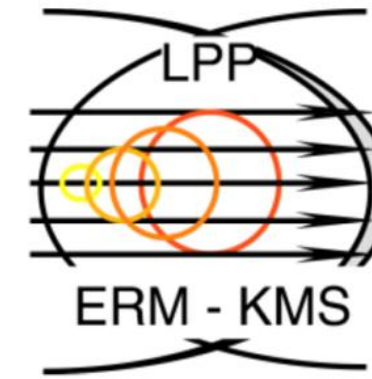
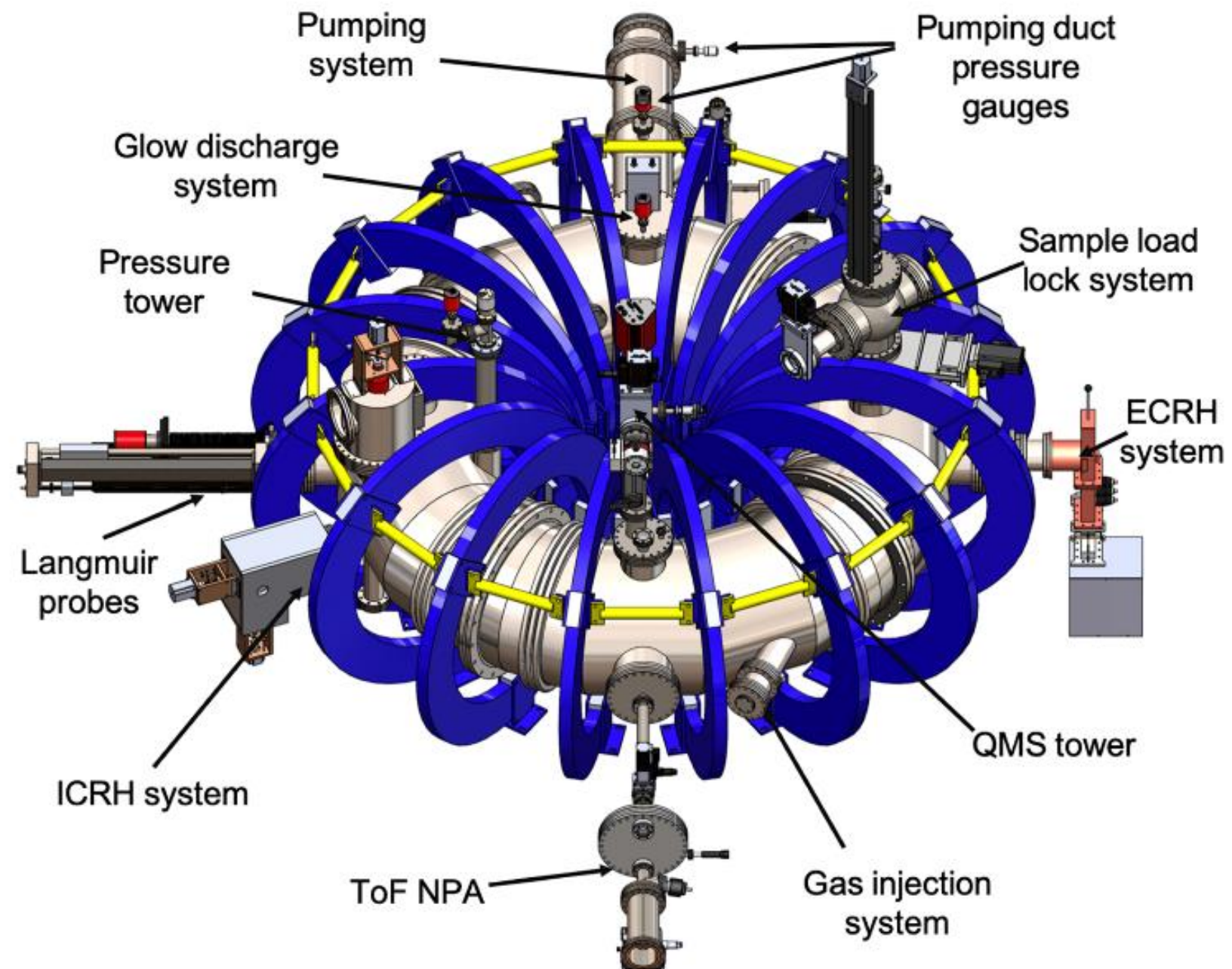


ION CYCLOTRON PLASMA HEATING AND WALL CONDITIONING

TOPIC 4

Determination of RF power deposition profiles in a tokamak plasma

Promoter: Kristel Crombé
Supervisors: Johan Buermans and Tom Wauters
Location: Technicum, Royal Military Academy (Brussels),
Forschungszentrum Jülich (Germany)



TOMAS (Toroidal Magnetized System)

TOMATOR-1D

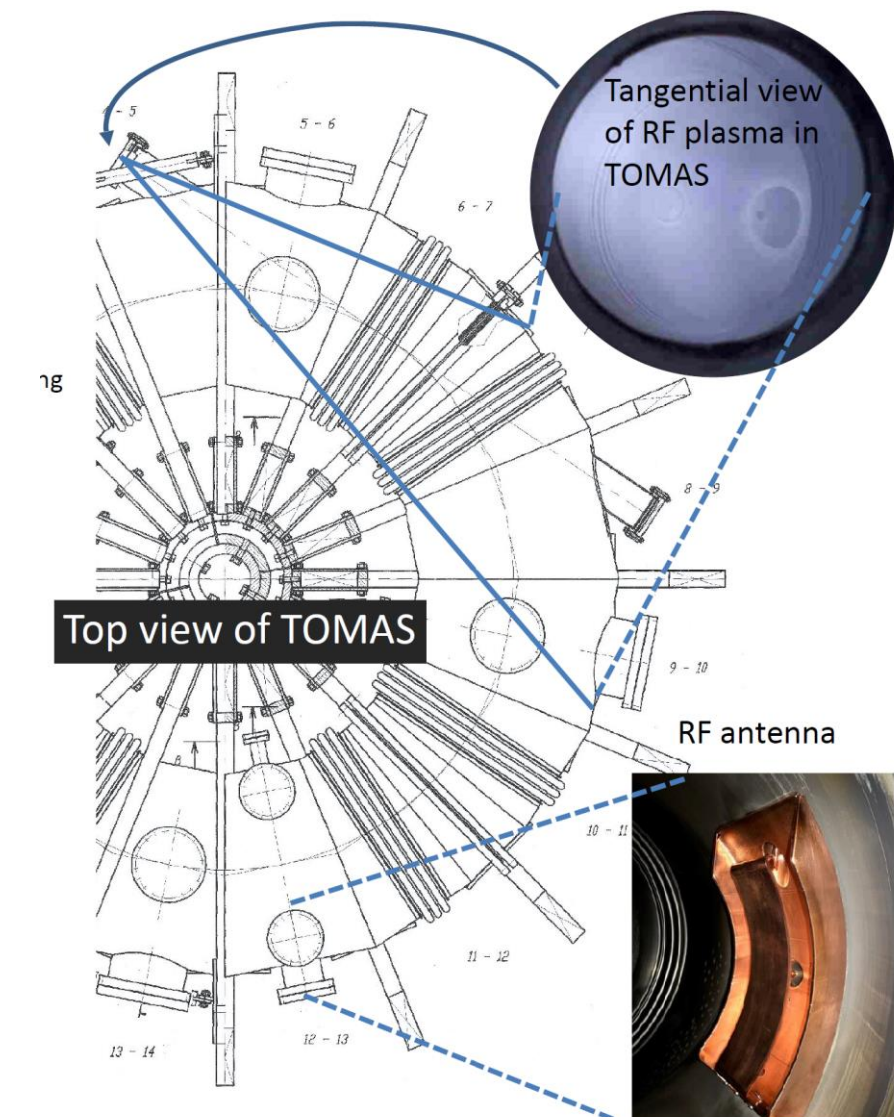
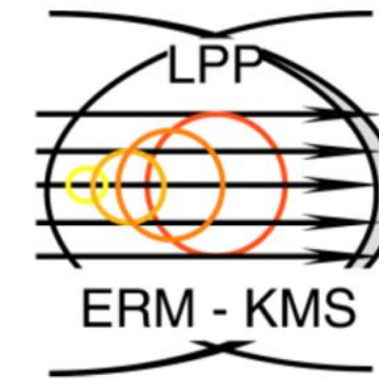
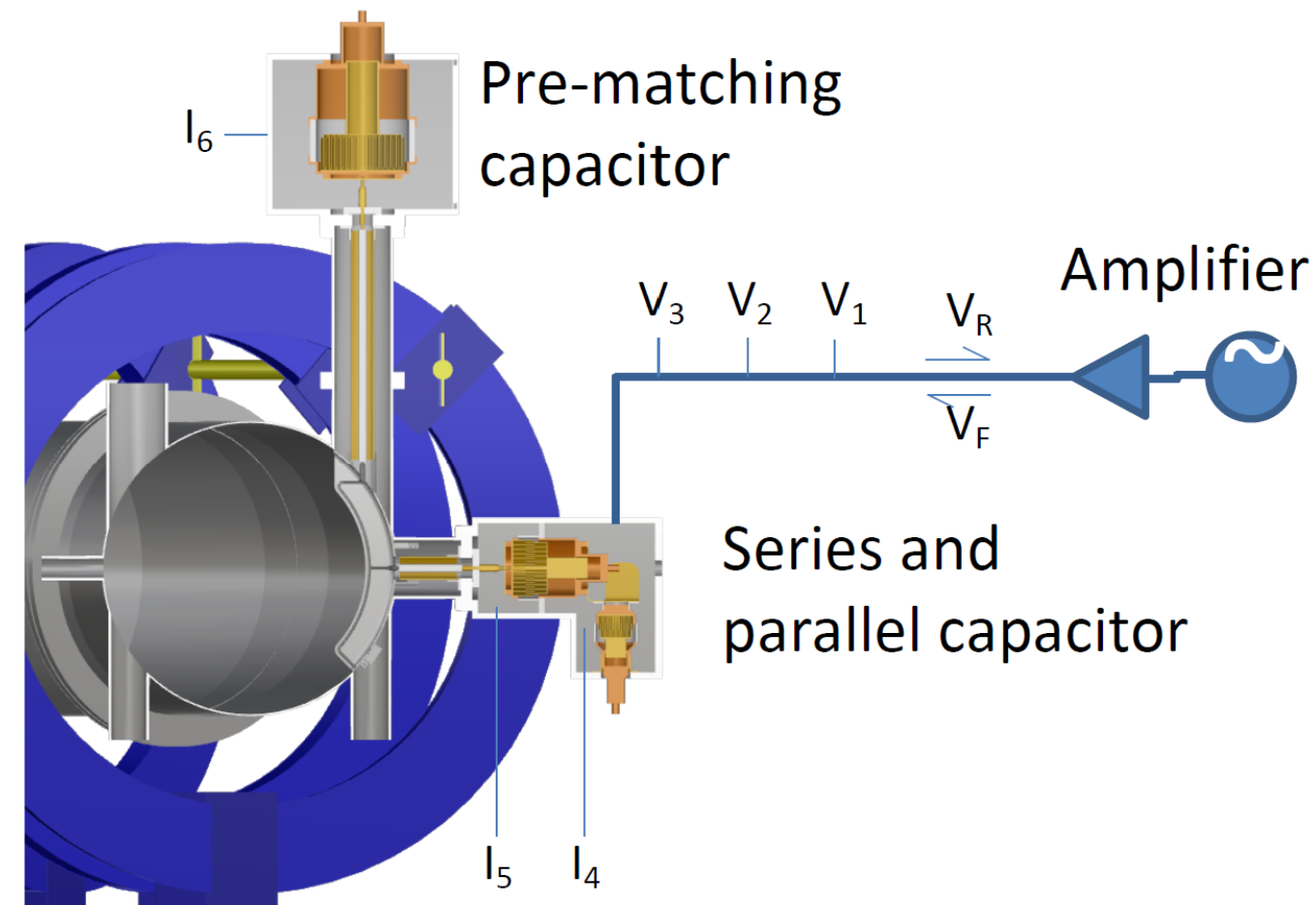
TOPIC 5

Experimental study of combined electron and ion cyclotron radio frequency discharges in TOMAS

Promoter: Kristel Crombé

Supervisors: Tom Wauters

Location: Technicum, , Royal Military Academy (Brussels),
Forschungszentrum Jülich (Germany)

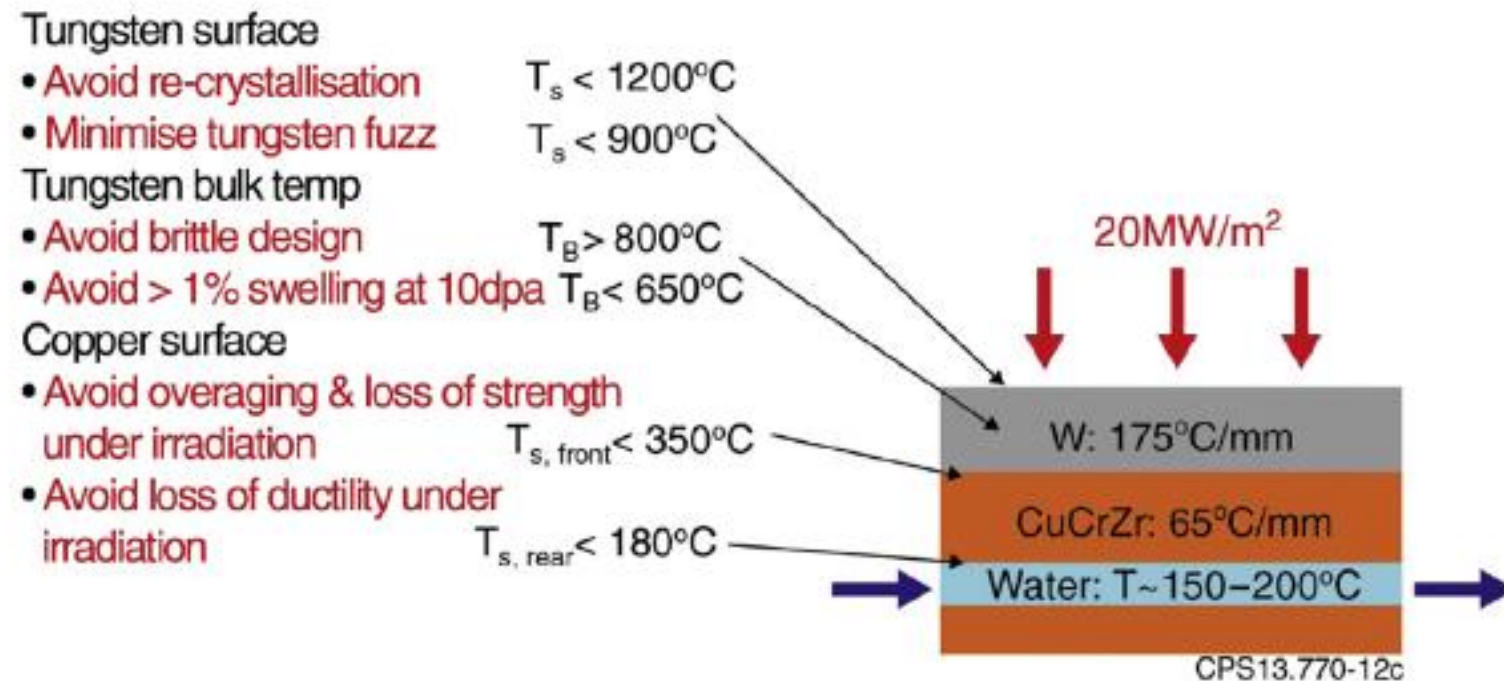


MATERIALS FOR FUSION DEVICES

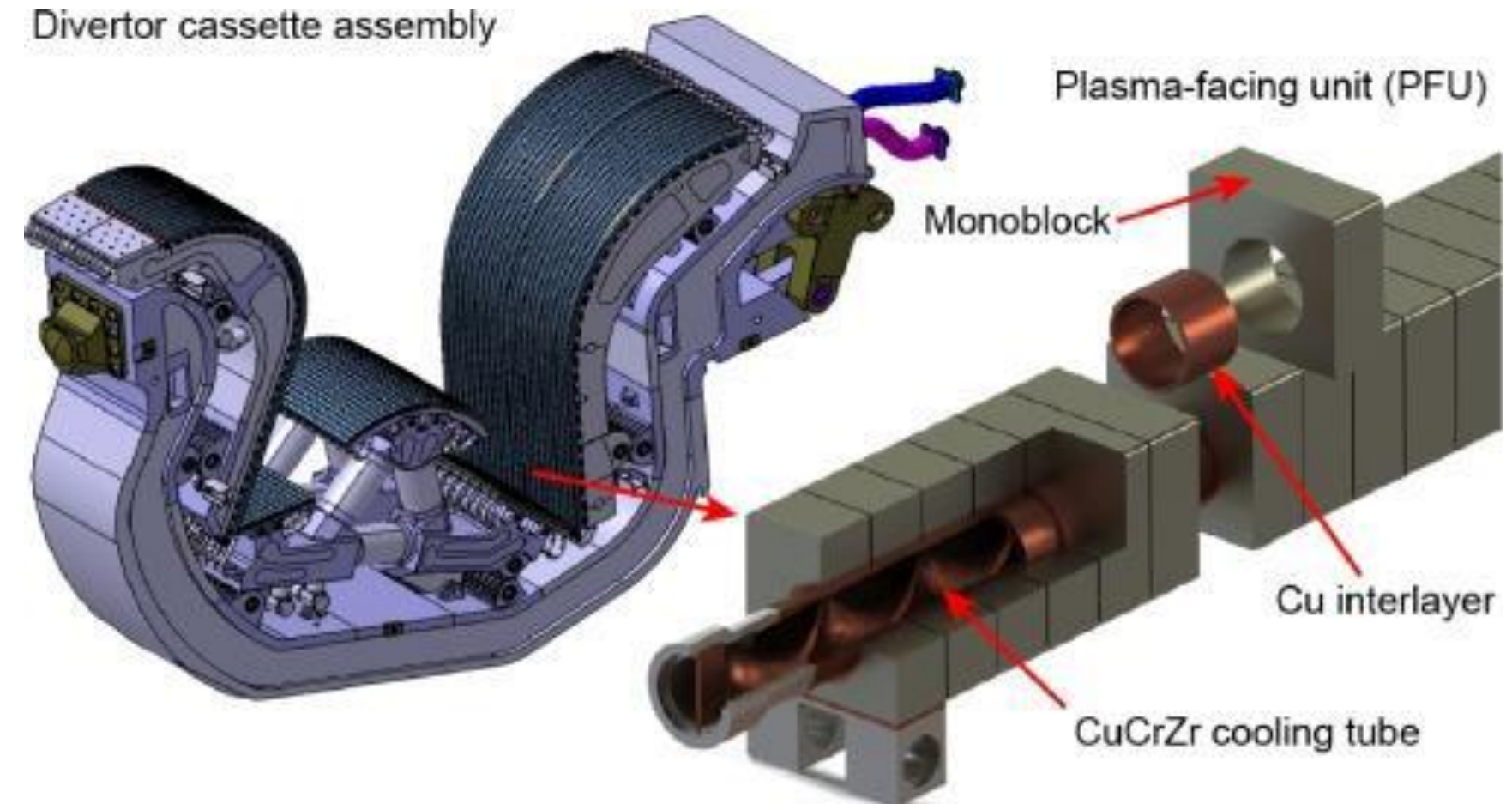
TOPIC 6

Study of anisotropy of plastic properties in pioneering materials for fusion applications

Promoter: Geert Verdoolaege
Supervisors: Alexander Bakaev and Dmitry Terentyev
Location: SCK•CEN (Mol, Belgium))



Mono-block concept of divertor for ITER & DEMO



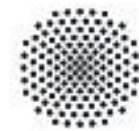
FUSION MASTER

- **FUSION-EP:**

European Master of Science in Nuclear Fusion and Engineering Physics

- 8 EU full partners

Co-funded by the
Erasmus+ Programme
of the European Union



Universität Stuttgart



uc3m

Universidad
Carlos III
de Madrid

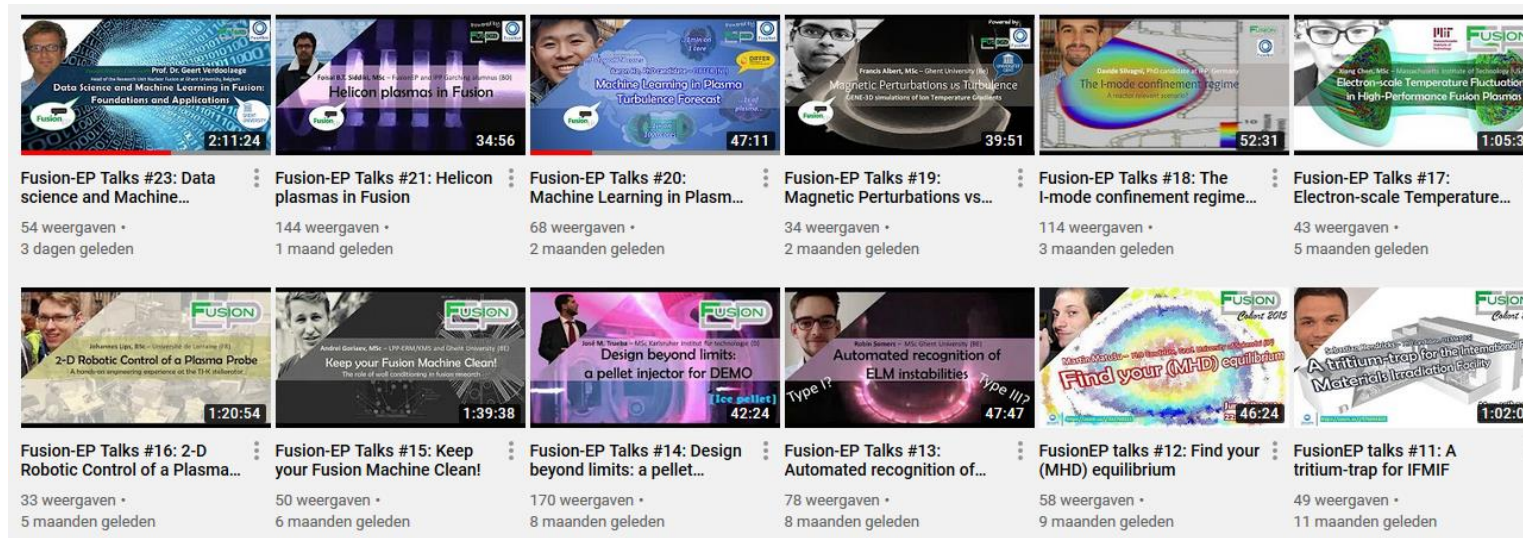
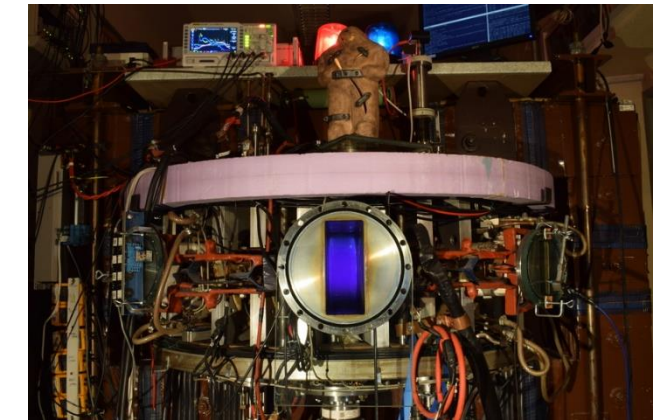


UNIVERSITÉ
DE LORRAINE



- 18 associate partners worldwide (incl. ITER IO)

- Alumni organization



<https://www.em-master-fusion.org/>



RESEARCH UNIT NUCLEAR FUSION

DEPARTMENT OF APPLIED PHYSICS

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