

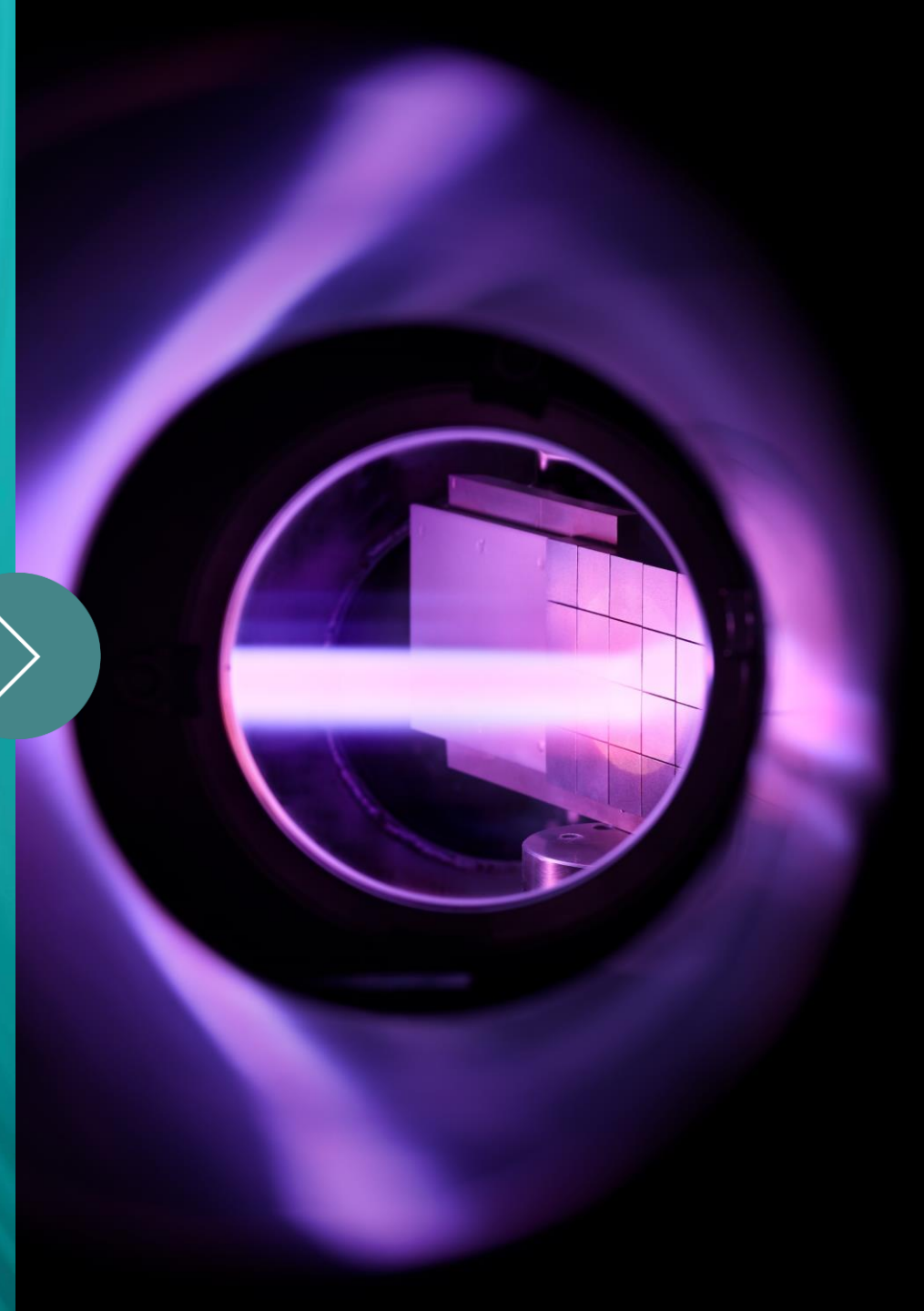
# SPA 1 Activities DIFFER 2023

T.W. Morgan<sup>1,2</sup>, J. Elenbaas<sup>2</sup>, D. Terentyev<sup>3</sup>

<sup>1</sup>*Dutch Institute for Fundamental Energy Research, Eindhoven, The Netherlands*

<sup>2</sup>*Eindhoven University of Technology, The Netherlands*

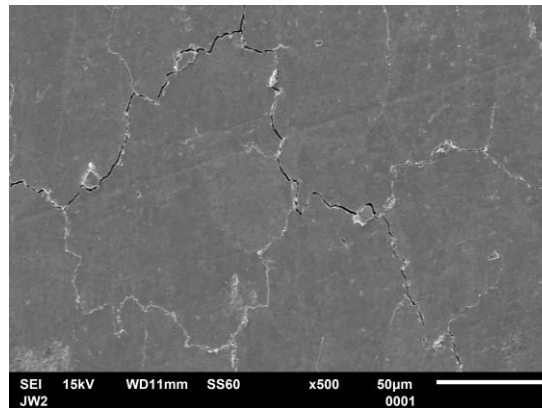
<sup>3</sup>*Belgian Nuclear Research Centre, SCK•CEN, Mol, Belgium*



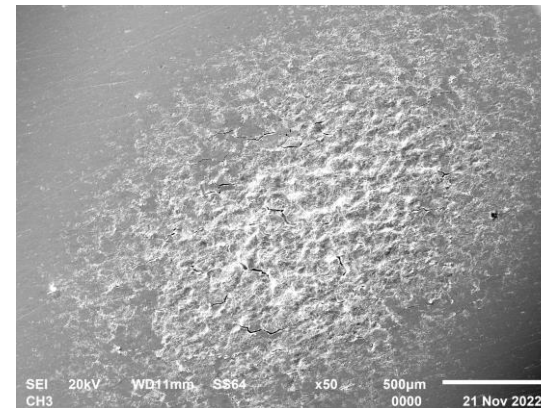
# Motivation

- Want to understand cracking behavior for different W grades (AT&M, ALMT, ALMT cross-rolled)
- Previous work showed similar cracking behavior going to high cycle number
  - Crack network formation
  - Strong plastic deformation and roughening for high temperature exposures
  - Correlated to runaway temperature excursion during ELMs (thermal isolation)
- Want to understand crack initiation and growth

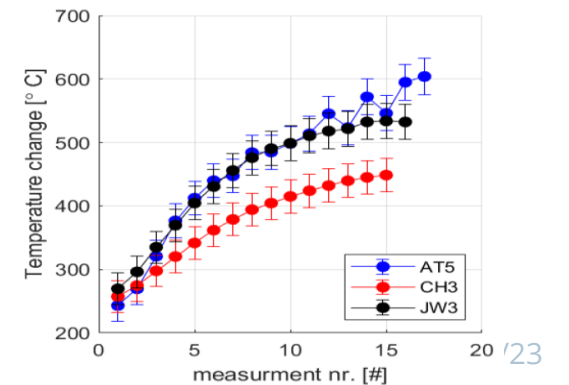
600 °C      6 MW m<sup>-2</sup> s<sup>0.5</sup>



1200 °C      6 MW m<sup>-2</sup> s<sup>0.5</sup>



1200 °C      6 MW m<sup>-2</sup> s<sup>0.5</sup>



# Approach

- Pre-cut cracks using FIB (done)
- Expose to LASAG ELM-like exposures in Magnum-PSI (vary  $N_{\text{pulse}}/E_{\text{pulse}}$ )
- Observe crack growth and propagation at the pre-cuts
- Re-expose samples at oblique incidence under sputtering conditions in Magnum-PSI
- Observe effect of crack leading edges and isolated grains on local erosion

