



WP PWIE SPA4 (2023): KIPT

D05: Influence of plasma pre irradiation with heat loads near surface recrystallization on surface damaging with heat loads above the melting threshold

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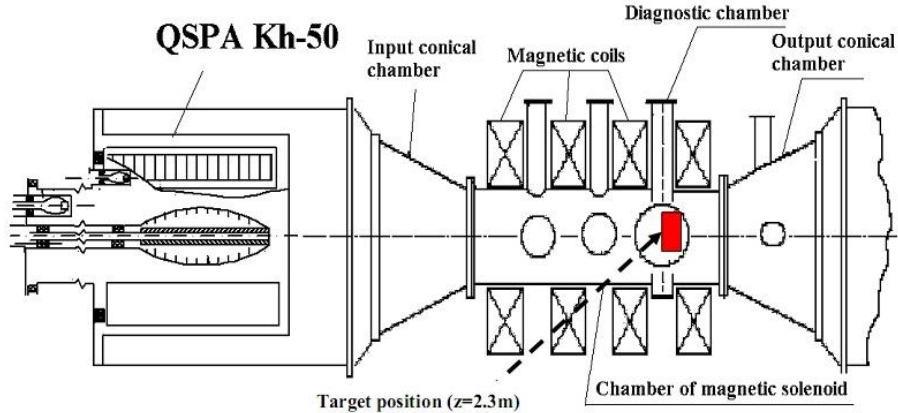
PWIE SPA Kick-Off meeting | 14.03.2023

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SPA4: Experimental facility QSPA Kh-50



Parameters of QSPA Kh-50 plasma streams

Plasma energy density, MJ/m ²	2.0
Plasma pressure, MPa	0.32
Plasma pulse duration, ms	0.25
Heat load on the surface, MJ/m ²	0.9
Plasma stream diameter (cm)	18
Impact energy of ions (keV)	0.4

Diagnostics

- ❖ Calorimetry
- ❖ Optical emission spectroscopy
- ❖ High-speed digital camera PCO AG

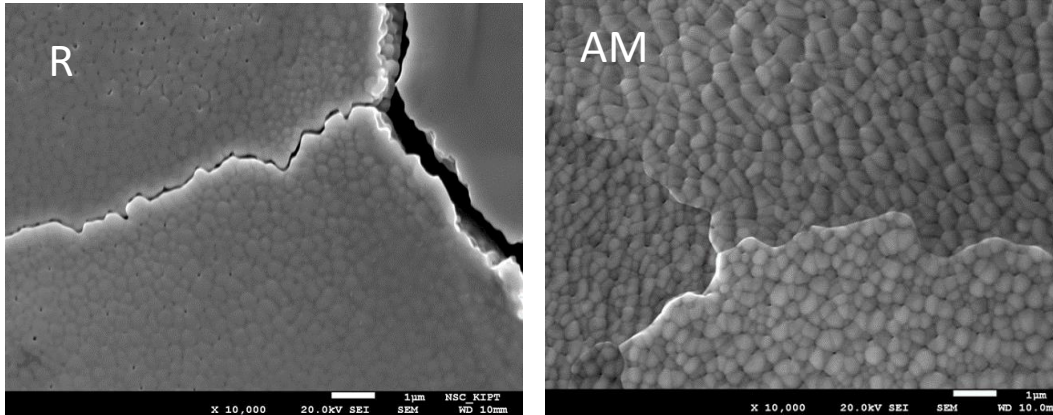
V A Makhlai et al 2020 *Phys. Scr.* T171, 014047
V.A. Makhlai et. al. 2021 *Phys. Scr.* 96, 124043

- Experiments were stopped due to the war in Ukraine from 24 February 2022.
- Team works remotely.

<https://euro-fusion.org/eurofusion-news/eurofusion-stands-in-solidarity-with-research-in-ukraine/>

Influence of plasma pre irradiation with heat loads near surface recrystallization

- ❑ Plasma heat loads which cause surface recrystallization and changes in microstructure and melting threshold
 - Tungsten material damaging in QSPA under giant ELMs/disruption-like loads which caused pronounced surface melting.
 - Contribution of plasma heat loads resulted in surface re-crystallization on degradation of melting threshold



Examples of surface modification of recrystallized (R) sample and Latticing Advanced Materials (AM) W/WTa sample

Abstract on Erosion and Modification of Tungsten Surfaces Under QSPA Transient Plasma Impacts was accepted as poster for PFMC-19 conference, May 2023 Bonn.



FAIRNESS



Transparency
Collaboration
Loyalty

OPENNESS



Open doors
Open hearts
Open minds
Open ears

COMMITMENT



Ownership
Critical thinking
Determination
Respect

DIVERSITY



Cooperation
Equal opportunities
Inclusion