

Dust mobilization from ITER-scale castellations

Charles H. Skinner¹, Stephan Gerhardt¹, Ricky Maqueda²,
Dennis Mueller¹, Roger Raman³, Lane Roquemore¹

¹PPPL ²Nova Photonics ³Univ. Washington

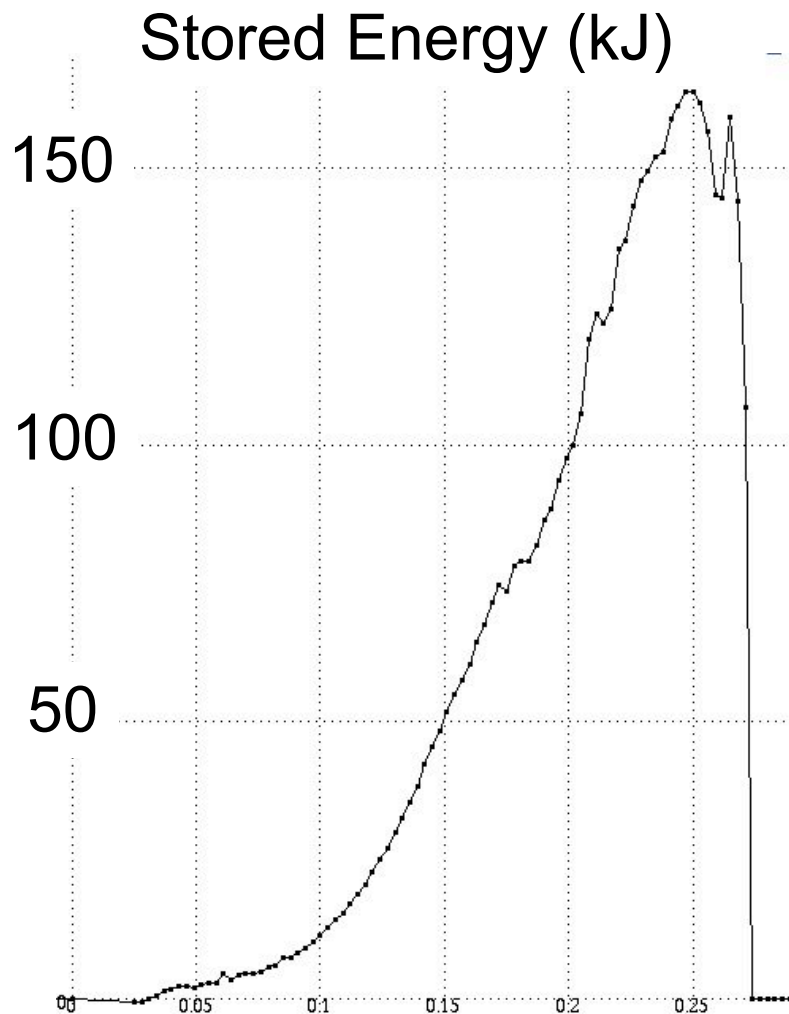
Motivation:

- Dust on ITER will fall down the gaps between tile castellations.
- The question is whether it is then permanently 'buried' or could be mobilized by a disruption.
- If the latter it needs to be included in safety assessments of the dust inventory and could contaminate ITER plasmas.
- *ITPA DSOL-21 Introduction of pre-characterized dust for dust transport studies in divertor and SOL*
- *ITPA DIAG-4 ITER Dust and Tritium Measurement*

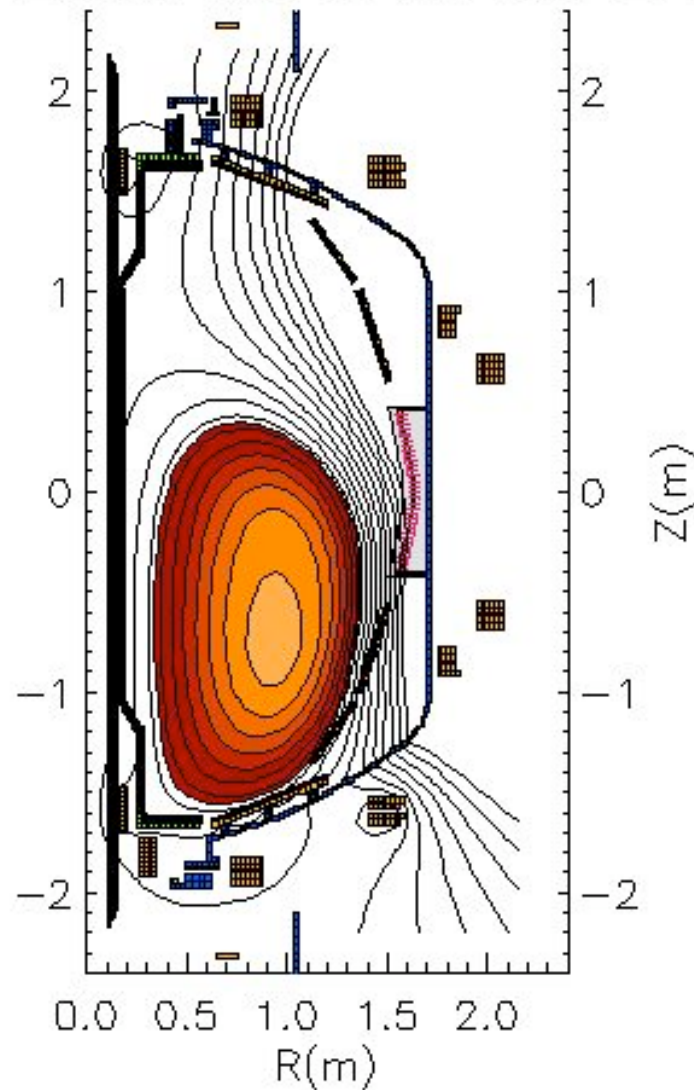
Plan:

- Insert PMI probe with ITER-scale castellations loaded with C/W dust mixtures.
- Subject to normal discharges and off-normal events.
- Track dust mobilization by weight loss, by fast cameras and spectroscopically.
- Model with DUSTT code (Pigarov, Smirnov).
- Run time needed: Piggyback (normal discharges) + few dedicated disruptions (1/4d).

XP938, run with C dust, 3 shots on 14 Aug. 09, 136155 disruption:



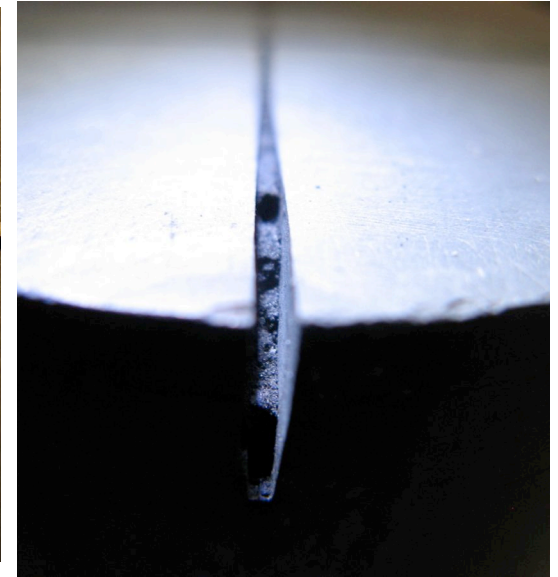
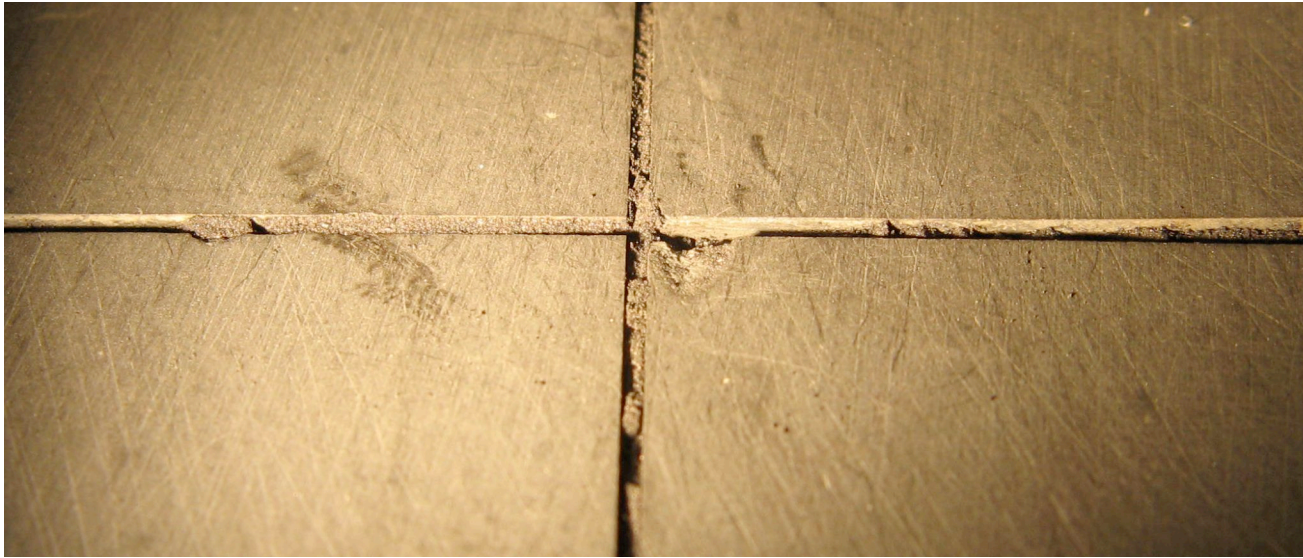
from \EFIT02, Shot 136155, time=271ms



EUROPA\$ dwscope -def auser7:[dml]efit02.dat

\EFIT02::WMHD/1000.

Castellation probe after disruption



- Fortafix 'plug' blown out of one gap.
- Significant particle loss from damaged areas
- Modest loss (~ 0.5 mm depth) from undamaged gaps.
- 12% of dust mobilized.
- FY10: align gaps parallel and perpendicular to B field.