

Divertor mockup testing – KIT plans for 2012-2013

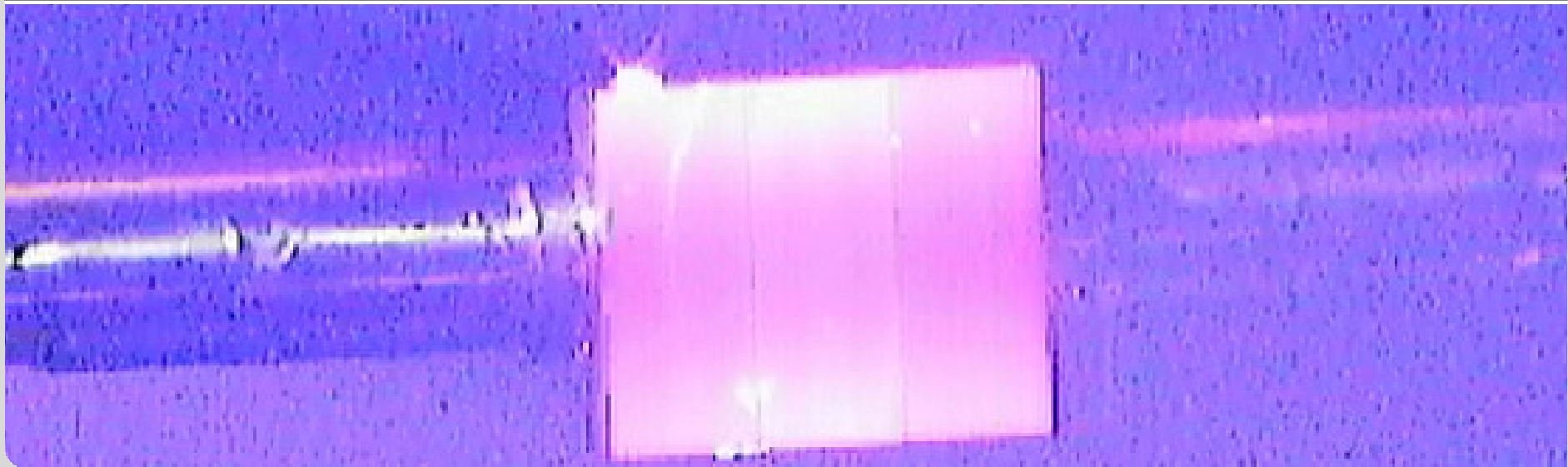
J. Reiser¹, M. Rieth¹, B. Dafferner¹, A. Hoffmann²

KIT-CCFE Divertor Technology Workshop, Culham, 29.05.12

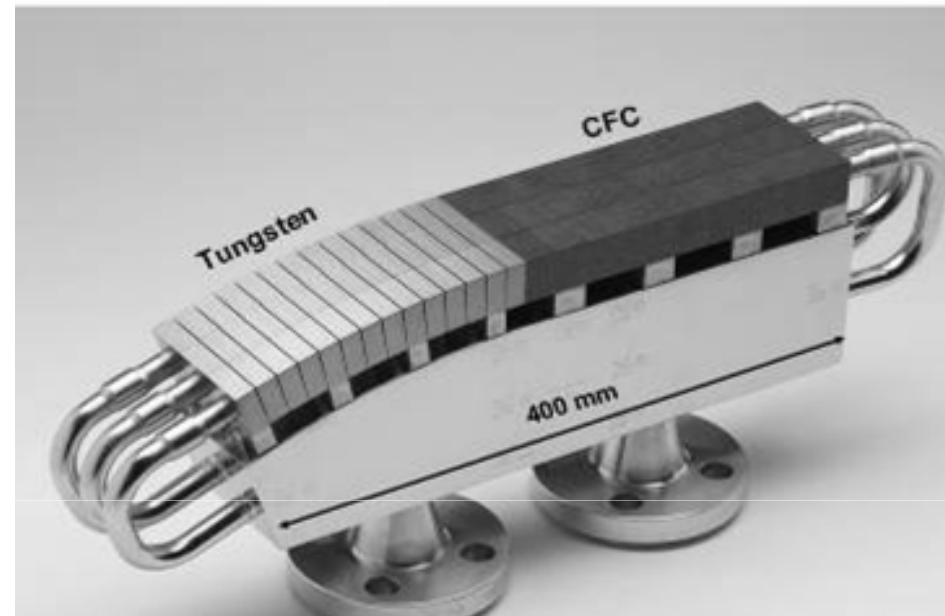
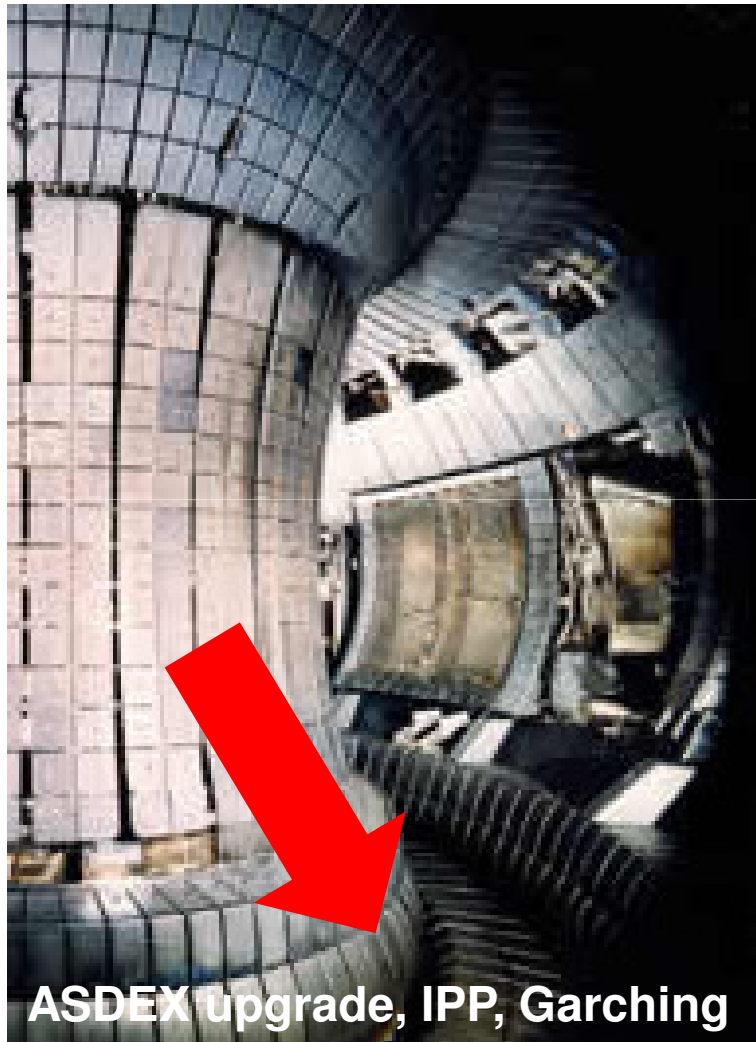
¹ Karlsruhe Institute of Technology, Institute for Applied Materials, IAM-AWP, 76021 Karlsruhe, Germany

² PLANSEE Metall GmbH, 6600 Reutte, Austria

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Divertor: pipe, surrounded by tungsten



Divertor matrix: coolant and material

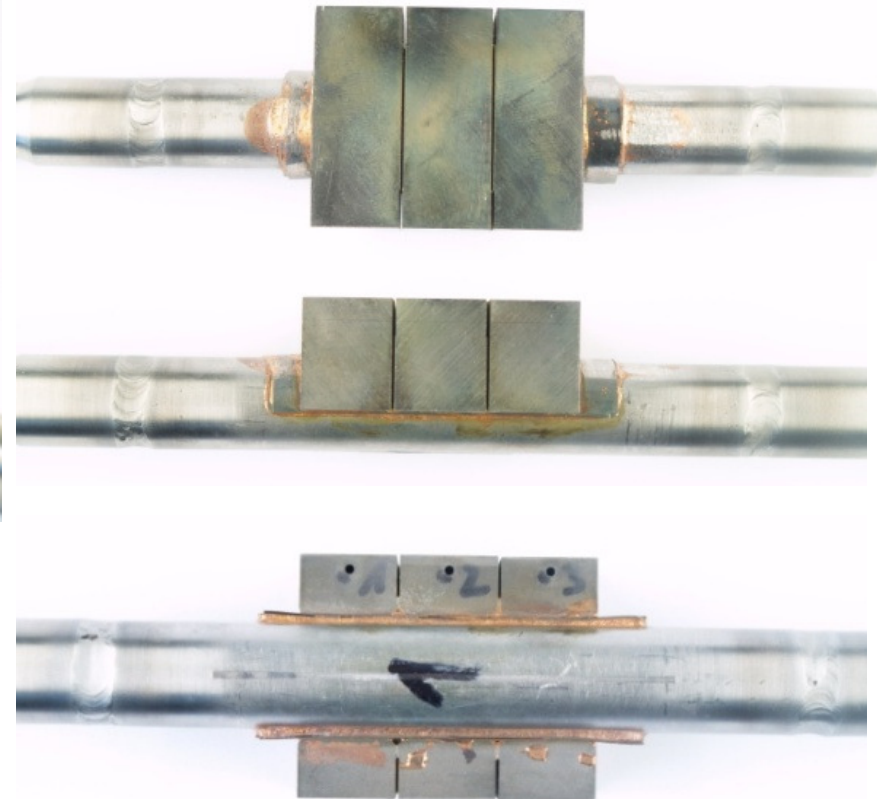
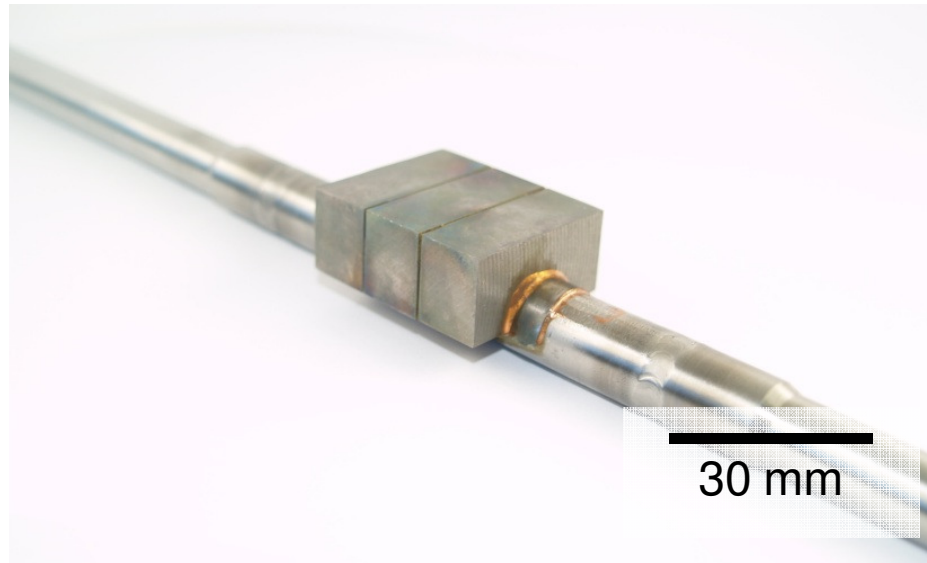
water	water	helium
100 °C – 120 °C, 40 bar	275 °C – 325 °C, 160 bar (PWR)	400 °C – 600 °C, 100 bar

Cu up to 250 °C	20 MW/m² see ITER	×	×
austenitic steel up to 550 °C	5 MW/m²	(< 5 MW/m²)	(1 MW/m²)
RAFM steel 350 °C – 550 °C/ 650 °C	×	(5 MW/m²)	1 MW/m²
W-laminate Cu: 400 °C – 800 °C	×	×	10 MW/m²

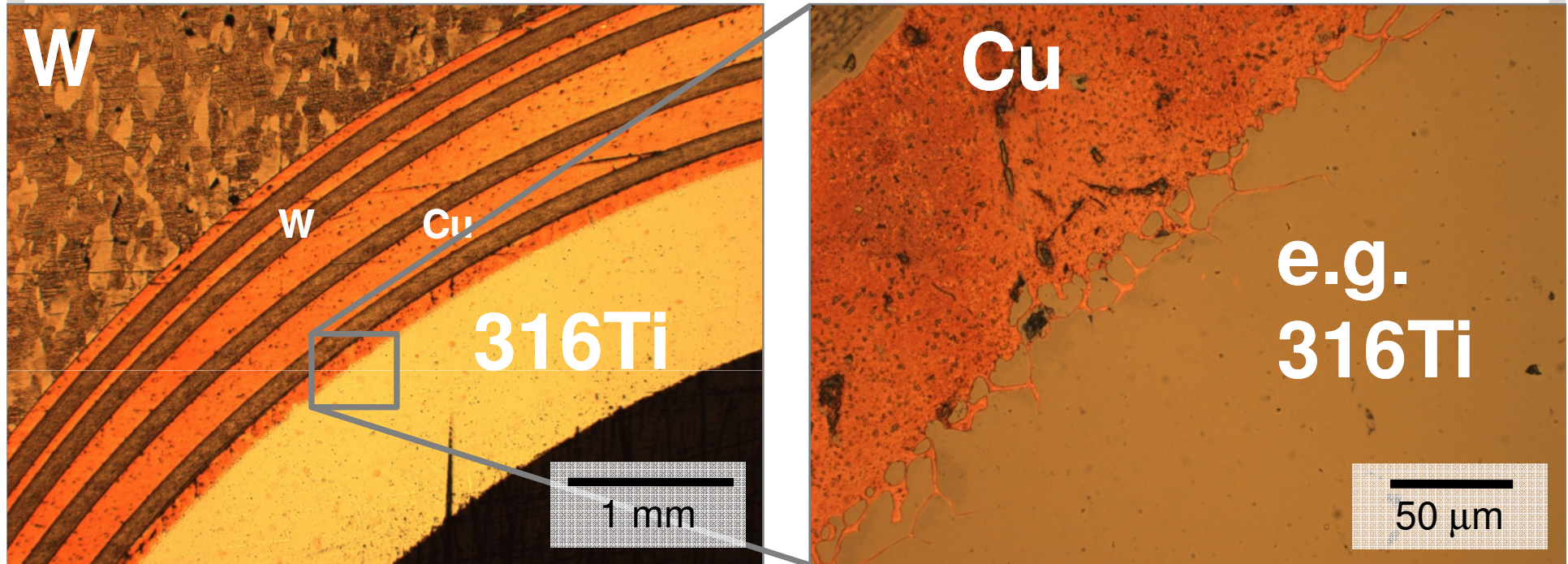
Water-cooled divertor

H₂O-cooled (100 °C – 120 °C, 40 bar), austenitic steel

Can we remove 5 MW/m² with water and austenitic steel?

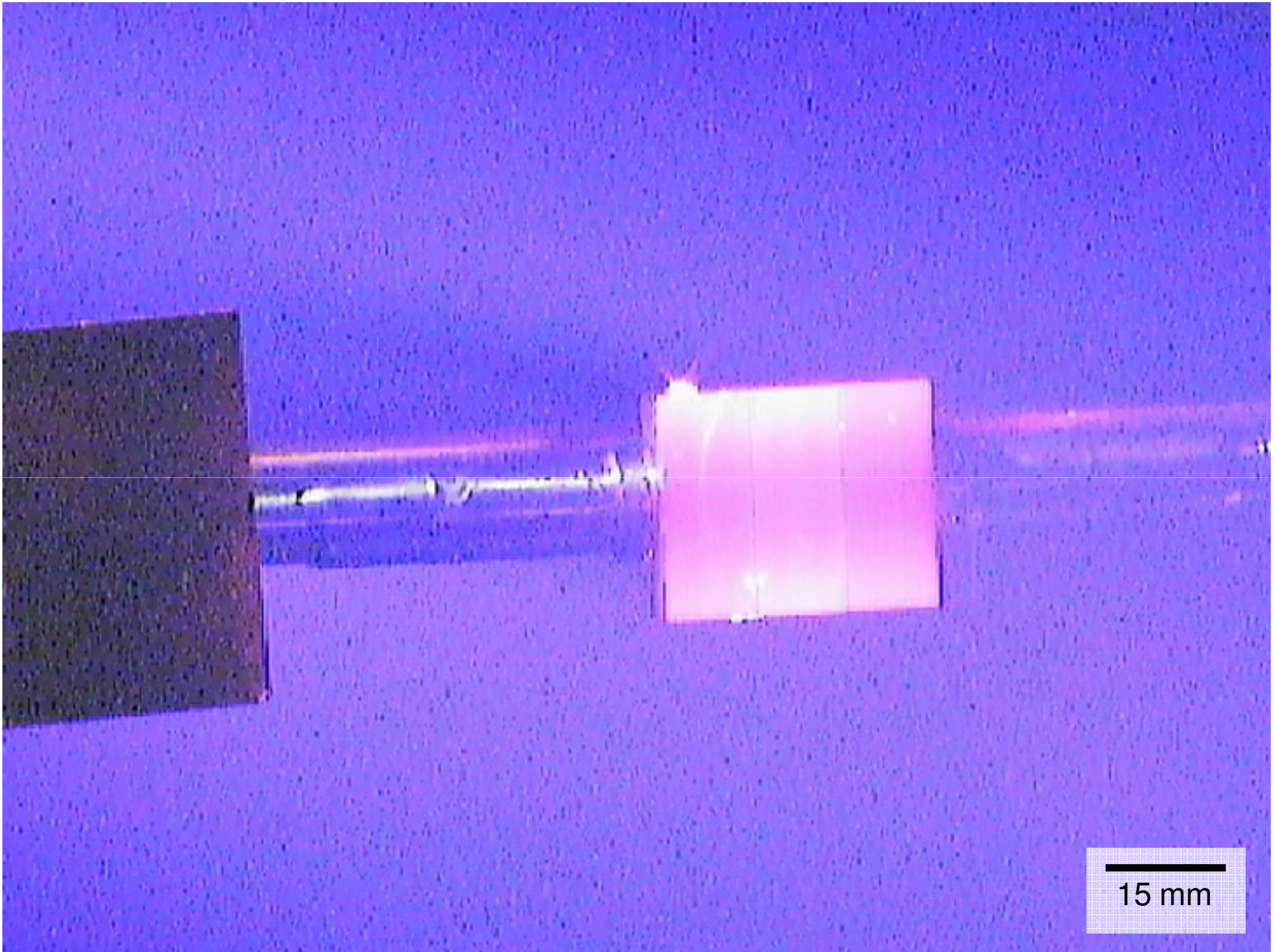


H₂O-cooled (100 °C – 120 °C, 40 bar), austenitic steel





GLADIS, IPP, Garching



H₂O-cooled (100 °C – 120 °C, 40 bar), austenitic steel

- Videos: W-Austenit-1#153040_3MW.avi
 W-Austenit-2#153058_6MW.avi

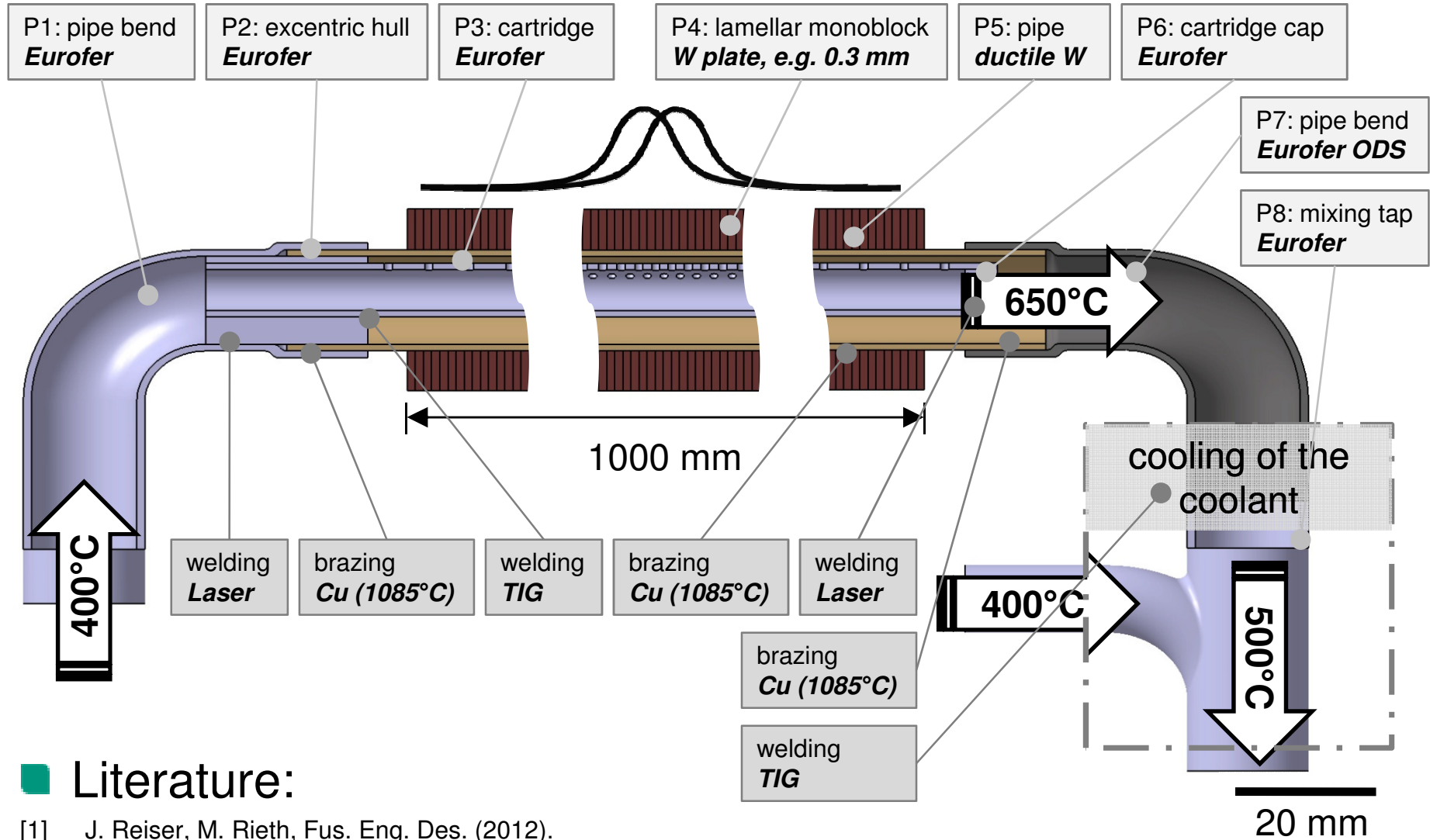
- Results:
 - NDT possible
 - 6 MW/m², 100 cycles (20 s on, 40 s off), mockup intact

Can we remove 5 MW/m² with water and austenitic steel?



Helium-cooled divertor

He-cooled divertor

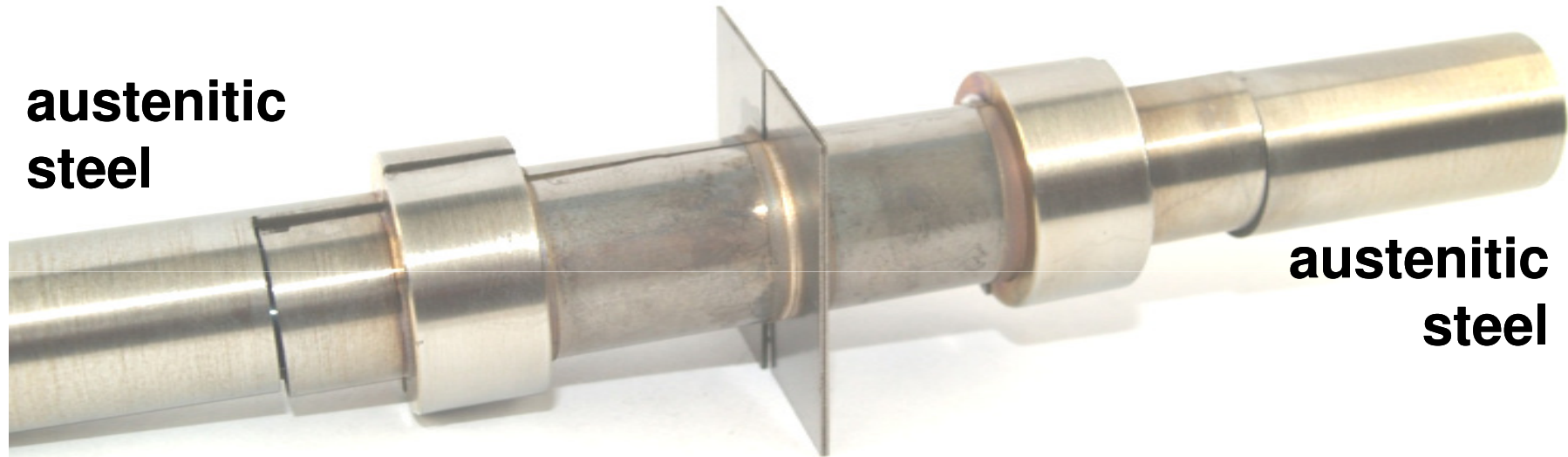


Literature:

[1] J. Reiser, M. Rieth, *Fus. Eng. Des.* (2012).

He-cooled divertor

W lamellar monoblock



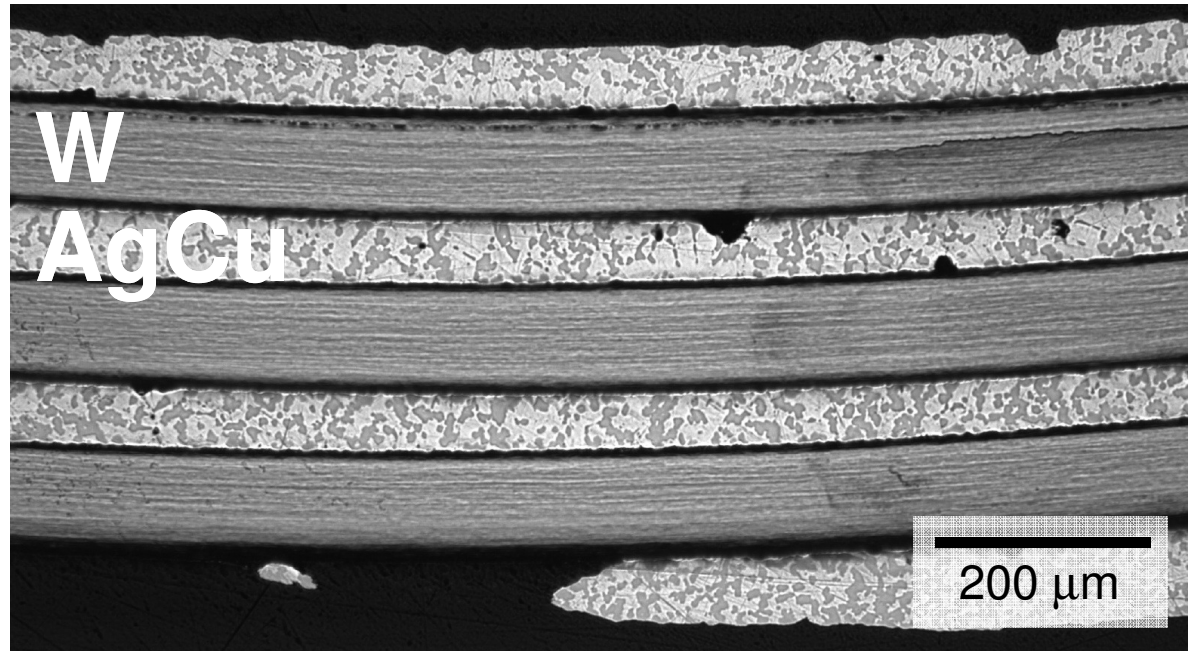
**austenitic
steel**

**austenitic
steel**

10 mm

W pipe made of W foil

He-cooled divertor

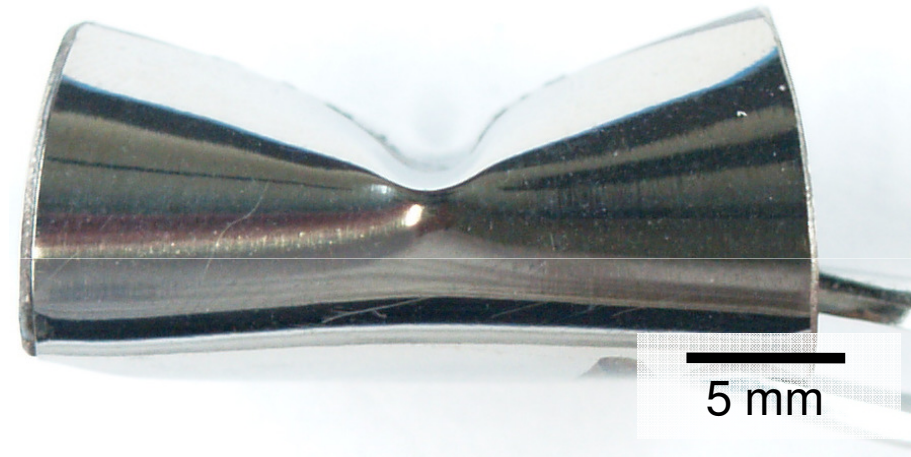


He-cooled divertor

pipe made from a rod



pipe made of tungsten foil



He-cooled divertor

austenitic
steel

W pipe made of
foil (AgCu)



in cooperation with
T. Huber, A. Zabernig; Plansee SE

Thank you for your attention

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