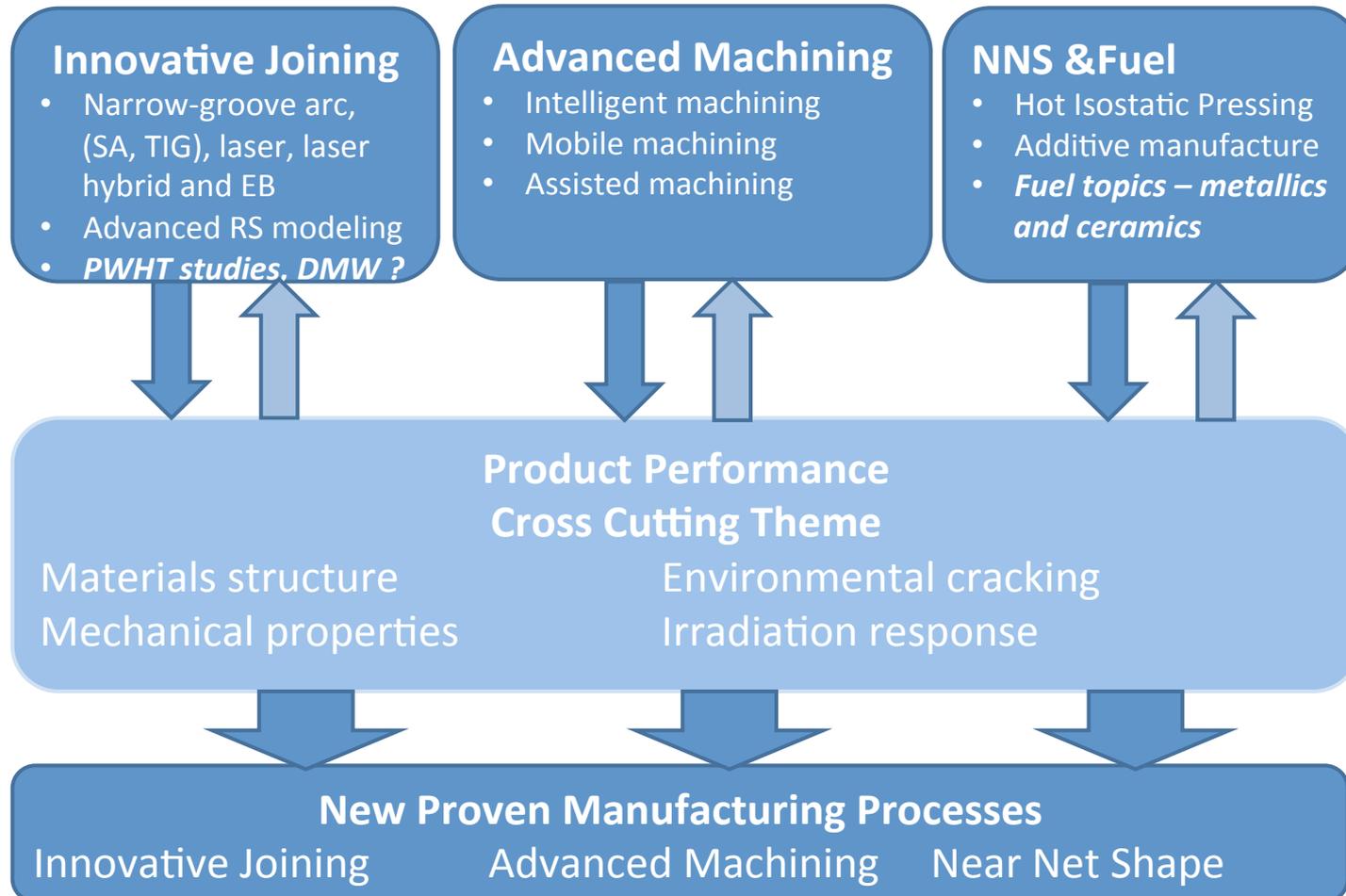
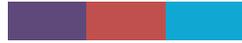




## New Nuclear Manufacturing



***Core Work Packages ~75%, with 25% held back for “Trailblazer” Projects***

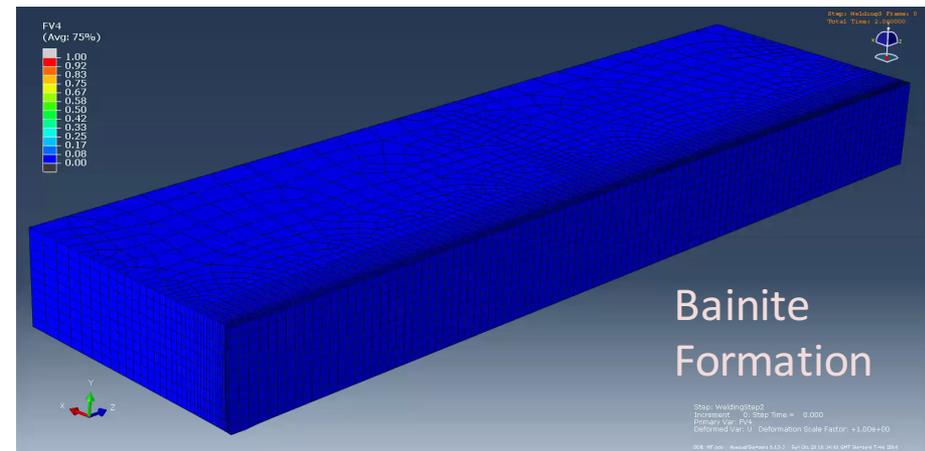
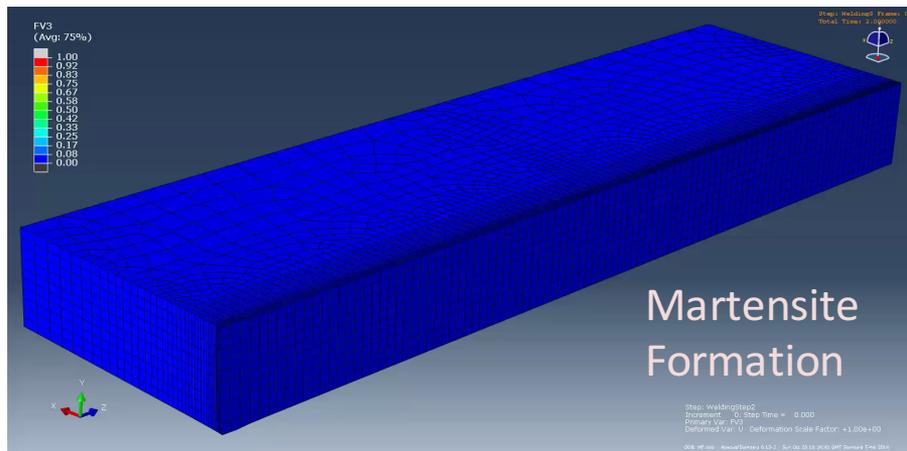
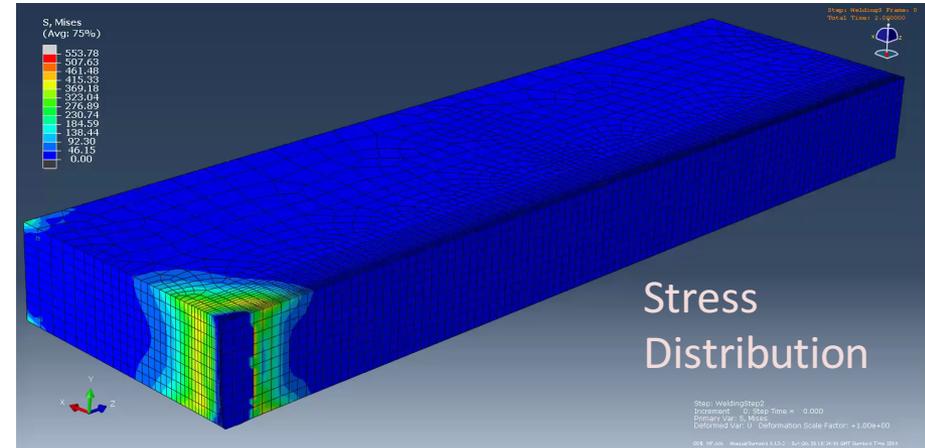
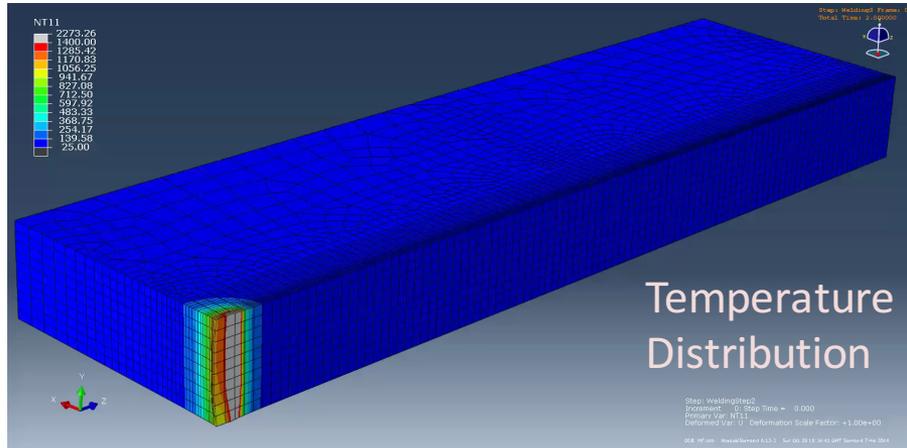


## Restraint rig in TIG bay



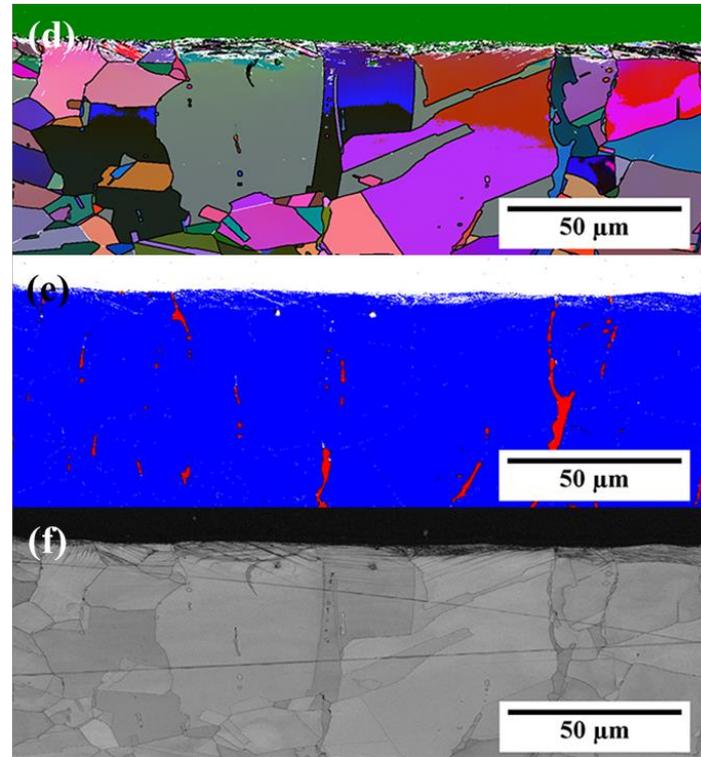
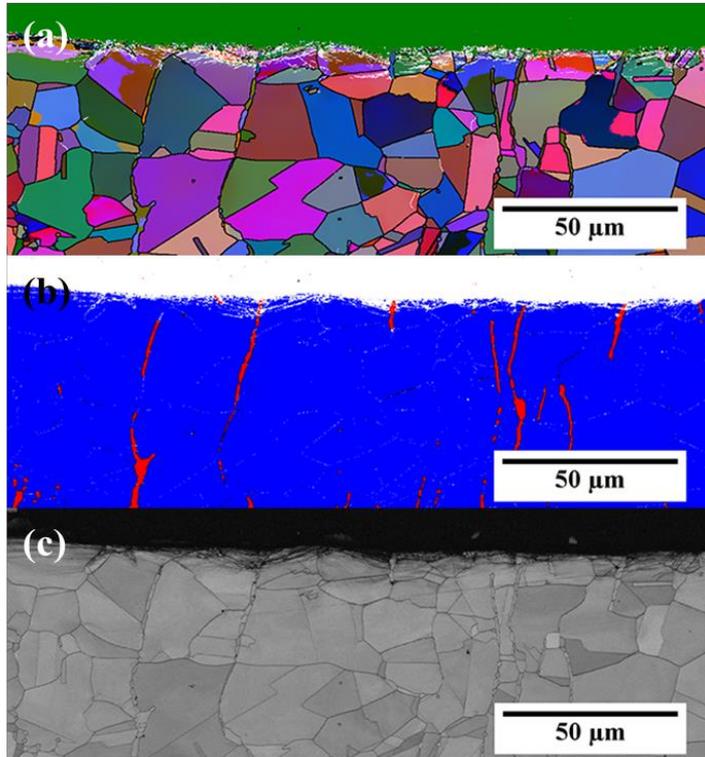


## EB 30mm [1-pass] – *Thermal & Mechanical Analysis, with Phase Predictions*



Includes collaboration with Cory Hamelin from ANSTO, Australia

## Deformed layer microstructure - 304L

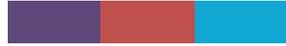


Euler

Phases (red is ferrite)

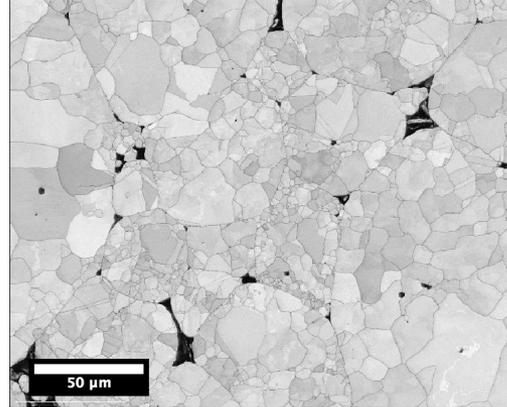
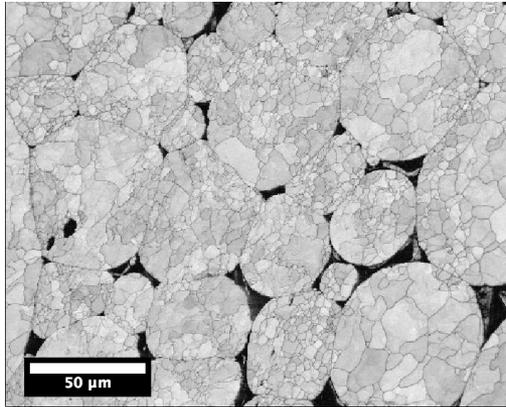
Band Contrast

» Thickness of fine-grained sub-surface microstructure is not consistent across different samples, nor grooves of the same sample



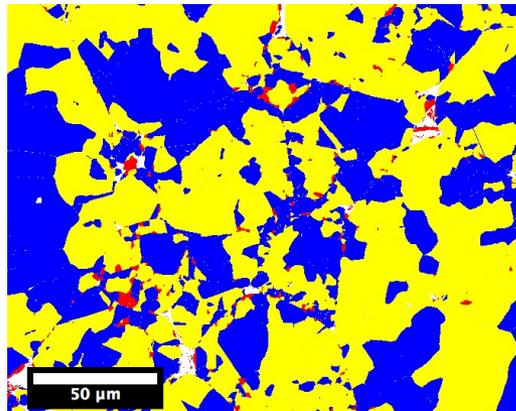
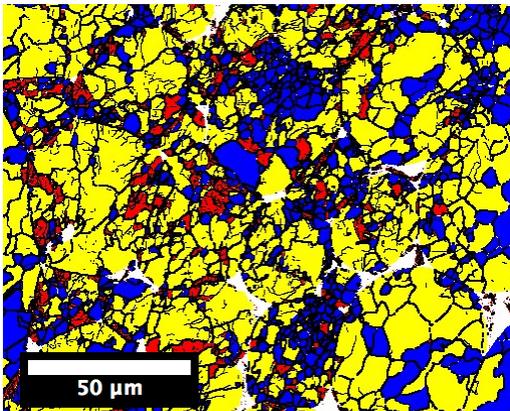
# Near Net Shape - HIP

Example: Carpenter powder



BC maps:

More subgrain boundaries in  
950°C HIP than in 1000°C HIP



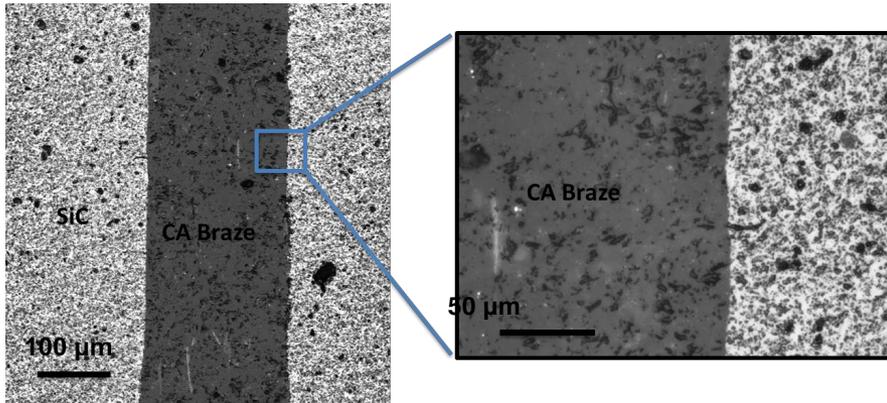
Red: deformed region; Yellow:  
substructured region; Blue:  
recrystallized region.

950°C HIP

1000°C HIP

**Additional projects now funded by EPRI**

# Advanced Nuclear Fuel – Joining of SiC-SiC

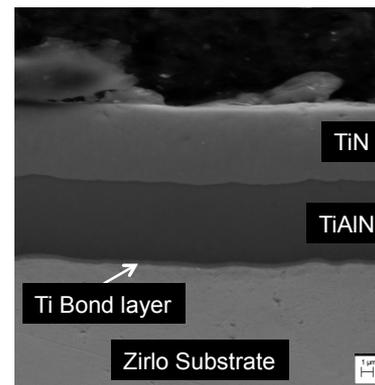
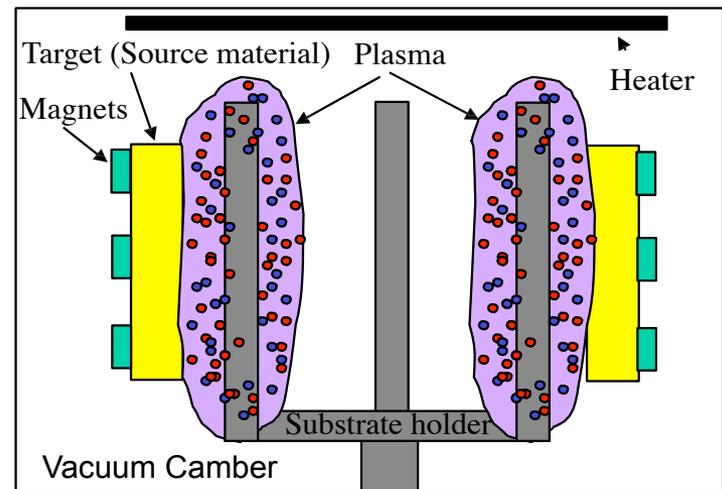
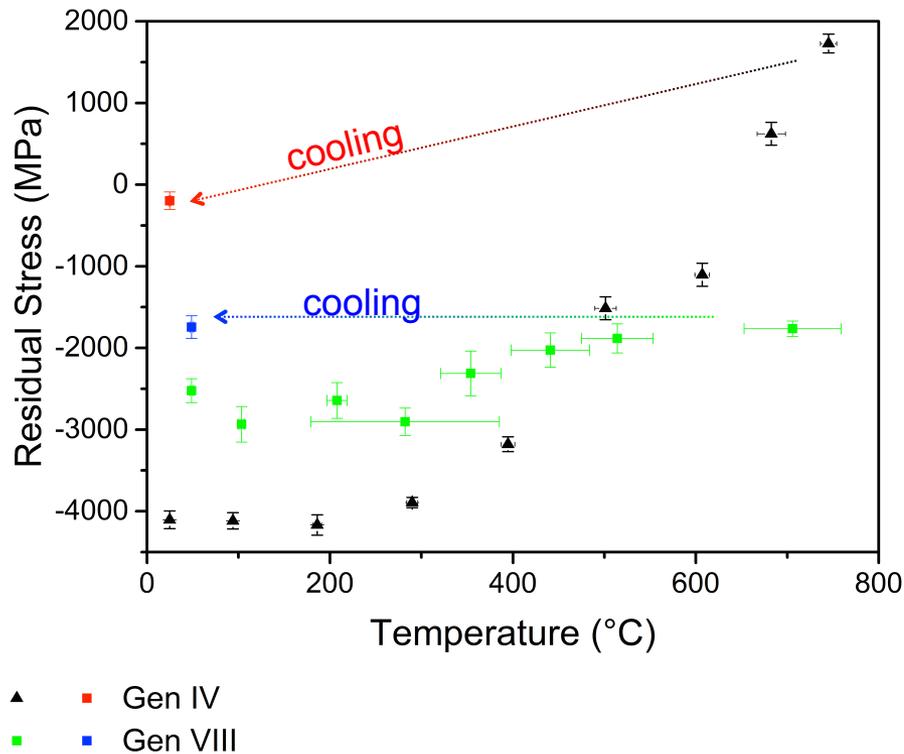


Three different braze materials are investigated:

- Braze SAY (Al<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub>, Y<sub>2</sub>O<sub>3</sub> powders)
- Braze CA (Al<sub>2</sub>O<sub>3</sub> and CaO powders)
- Braze SAMg (SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub> and MgO powders)



# Accident Tolerant Fuel – Collaborations with Penn State (C<sup>3</sup>) and University of Illinois (Zircaloy Cladding Modifications)



Collaboration with Penn State - (C<sup>3</sup> program)