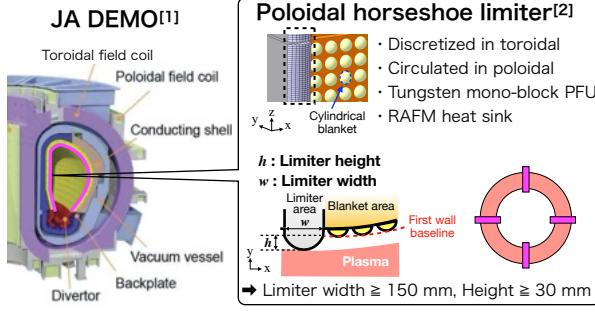


# Structure Design of Poloidal Horseshoe Limiter for Pulse Operation Heat Load in JA DEMO

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## Overview



Pulse operation is anticipated to be implemented during the initial phase of JA DEMO operation<sup>[3]</sup>  
 → Cyclic thermal stress caused by the heat load deposited on limiter lead to thermal fatigue and possibly dominates the lifespan of the limiter

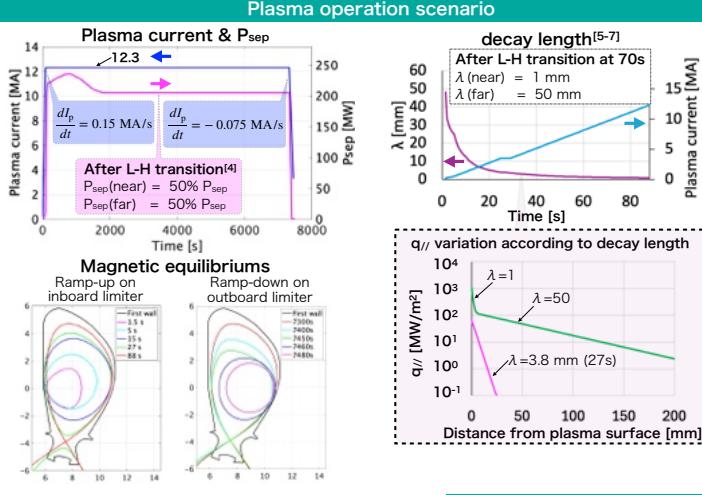
### Objective

- Evaluate the heat load during pulse operation
- Evaluate the thermal stress in the PFU of the limiter and propose an improvement for PFU design

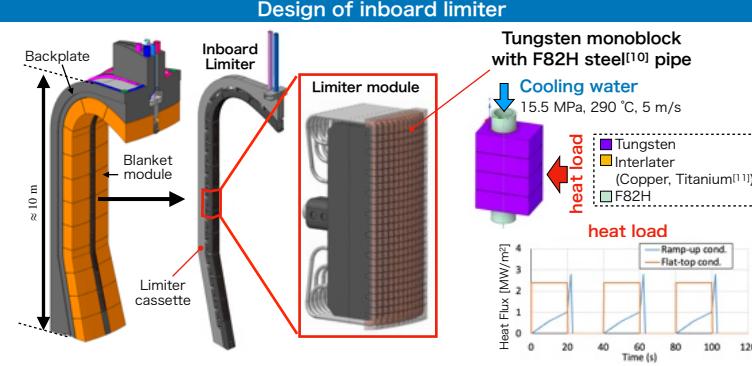
### Achievement

- The highest heat load on limiter is 2.8MW/m<sup>2</sup> at ramp-up phase, 2.4MW/m<sup>2</sup> at flat-top phase
- PFU with copper interlayer depicts high and critical stress on F82H pipe
- PFU with titanium interlayer absorbs the thermal stress and lowers F82H pipe's stress

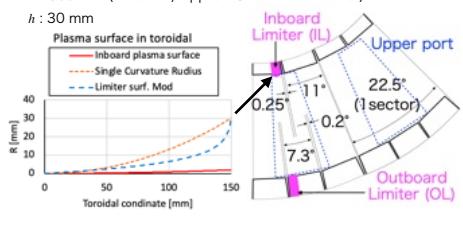
## Heat load on limiter during pulse operation



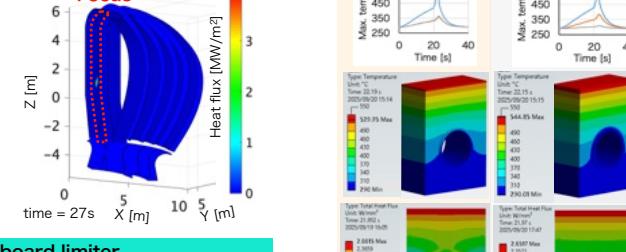
## Thermal stress analysis for plasma facing unit



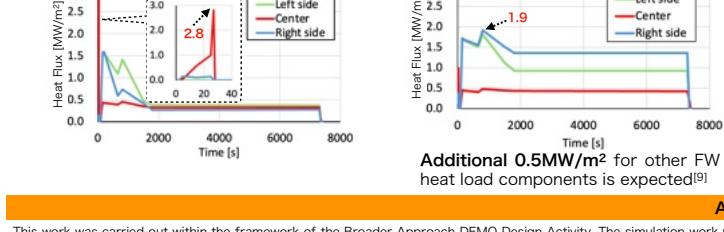
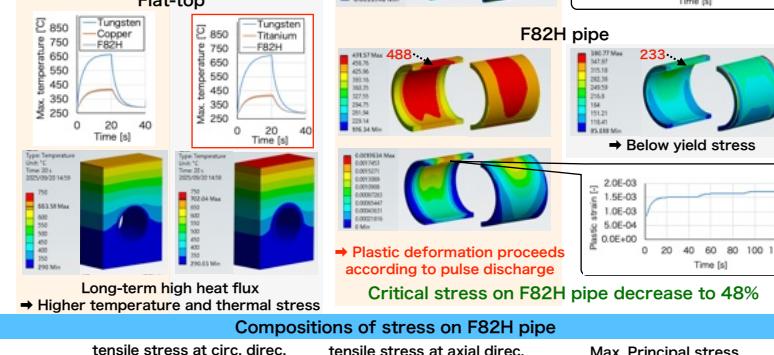
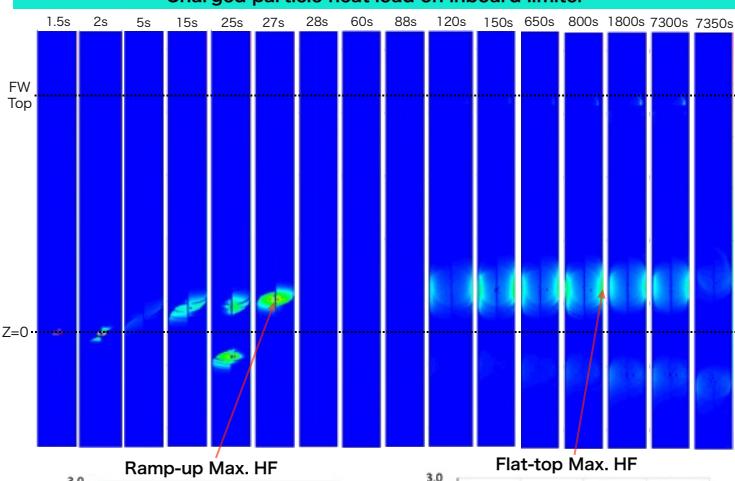
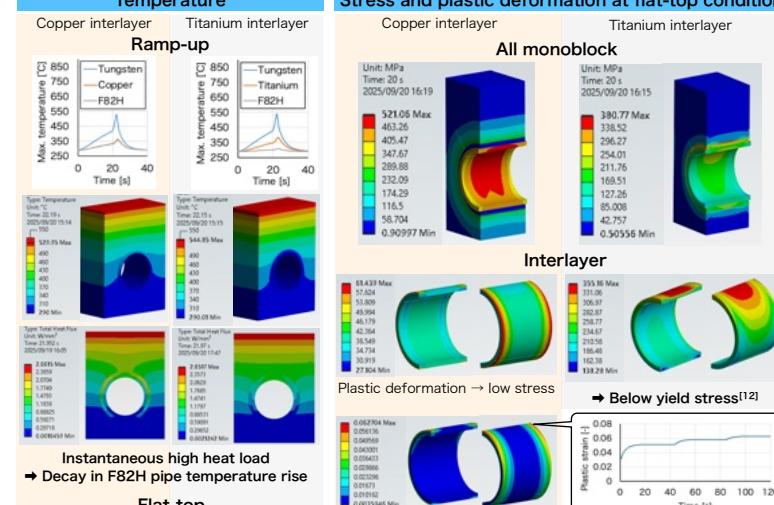
## Design of limiter surface<sup>[8]</sup>



## Charge particle heat load<sup>[9]</sup>



## Thermal stress on tungsten monoblock



## Acknowledgement

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