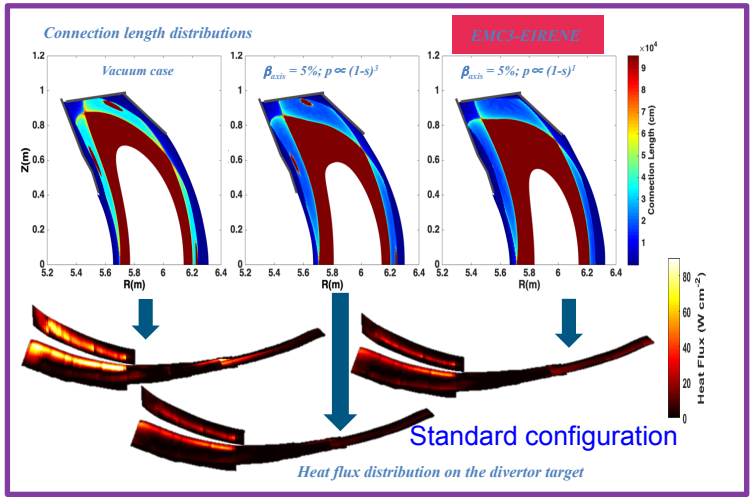
ID: 936 Leveraging 3D magnetic topologies in support of long-pulse high performance plasma operation

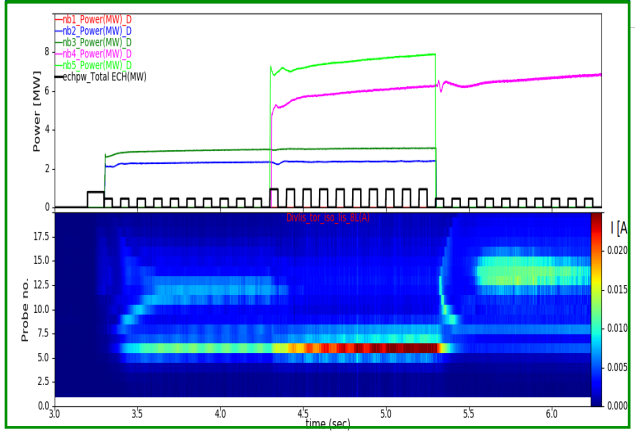
SUMMARY Y. Liang, et al. (FZJ, Germany) *10-15 May 2021*

- **Plasma-Wall Interactions (PWI): A Great Challenge for High Performance High Power Long-Pulse Operation.**
- **3D edge physics is important for optimization of PWI in view of long-pulse operation**
- **In the last two years, the international joint experiments of 3D edge physics and its application in active control of divertor flux redistribution have all made great progress.**
- **It turns out that the synergy between 3D magnetic topology and edge plasma transport may provide a new means for heat-flux control, which is a key issue for next-step fusion development.**

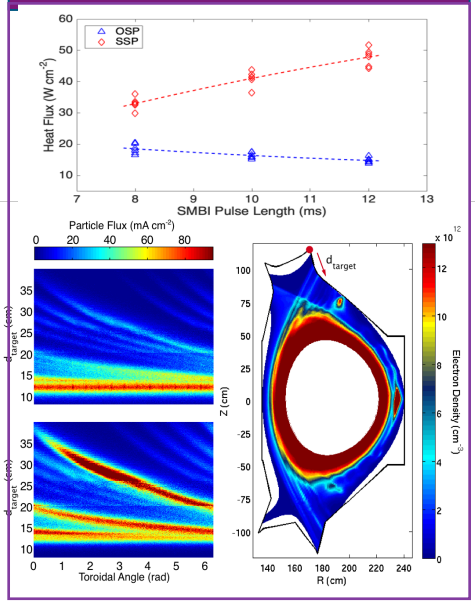
Magnetic topology changes induced by beta effects not only have a significant influence on the heat flux pattern on divertor targets, but also affect the power dissipation in the SOL.



In the peripheral region, magnetic field lines become stochastic as beta increases. The volume inside LCFS shrinks drastically. This will result a significant change in the footprints of the LHD helical divertor



Synergy effects of the SMBI and the LHW-induced magnetic perturbations on the divertor heat flux redistribution has been simulated by EMC3-EIRENE, and it is agree well with experimental observations.



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