

UEDGE analysis of X-point Target Divertor (XPTD)¹: Stable, fully detached divertor maintained over a factor of ~10 variation in exhaust power

- Upgrade of UEDGE allows simulation of secondary X-points in divertor legs
- Power exhaust window for attaining stable detachment is explored for XPTD, compared to other concepts: standard vertical plate, long vertical leg, Super-X
- Combined effects of long leg, neutral interactions and secondary divertor x-point lead to a factor 5-10 enhancement in the peak power handling and operational power window for XPTD compared to a standard divertor

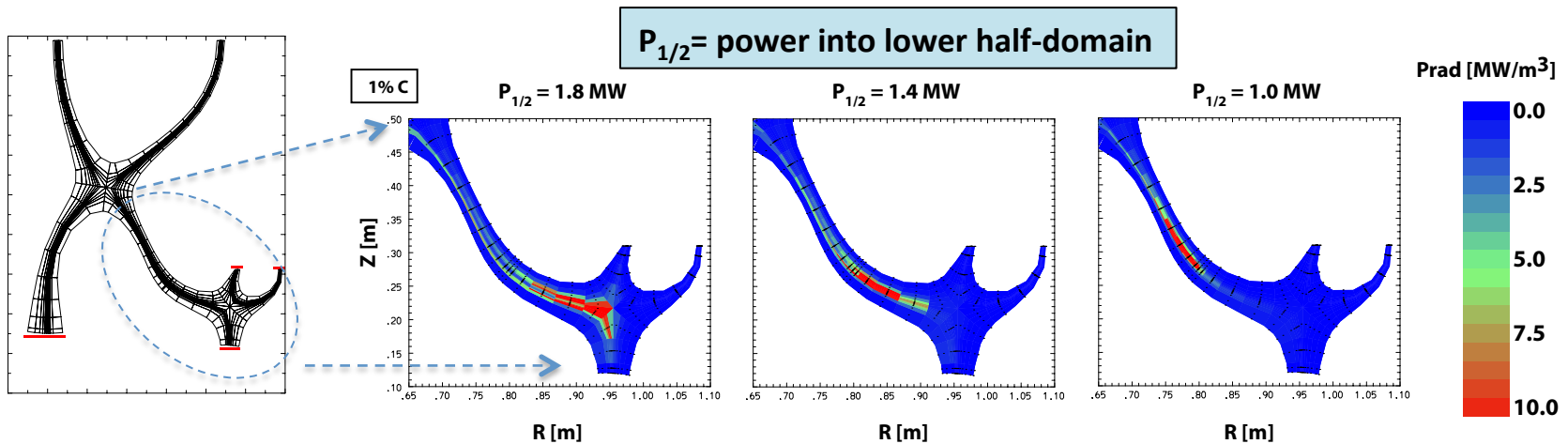


Fig.1 : UEDGE grid for a XPTD configuration based on the ADX divertor test tokamak²

Fig.2 : Outer leg of XPTD from UEDGE simulations. As exhaust power is increased a stable radiation/detachment front moves to larger major radius, accommodating a factor of ~10 variation in exhaust power