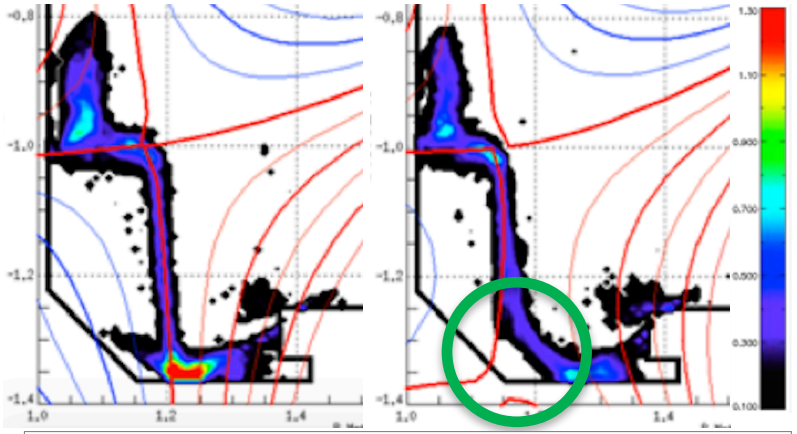
X-Divertor Magnetic Geometry Enables Detachment at Lower Pedestal Density and Higher Pedestal Pressure

- X-Divertor flux expansion increases the divertor's power-dissipating volume downstream at the target
  - Where collisionality is highest for neutral interaction
  - Enables detachment at lower upstream densities

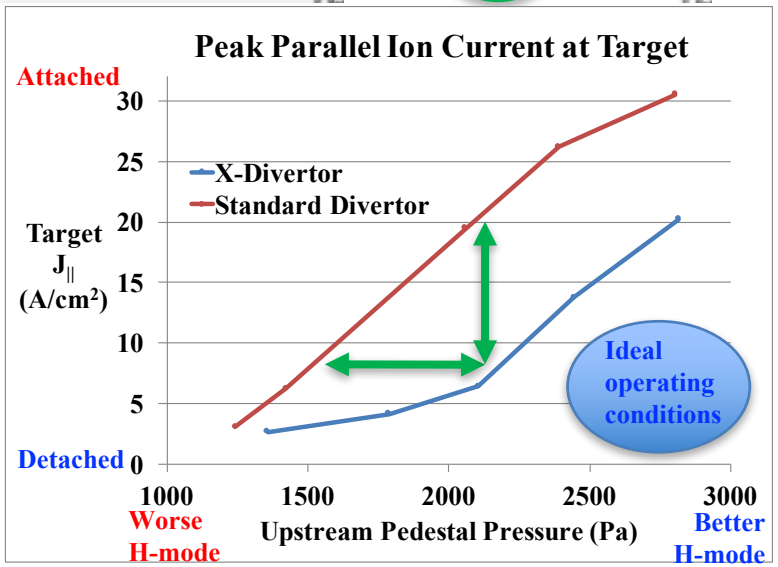
- The X-Divertor poloidal field gradient (flaring) passively resists upstream cooling near the x-point at detachment, slowing degradation of the H-mode pedestal pressure at higher densities

C^{3+} emissions ($n_{e,ped}$=3.6e19)

Std. Divertor (160570) X-Divertor (160563)



The XD T_e front peels away from the target at lower $n_{e,ped}$



XDs exhibit lower J_{sat} for a wide range of P_{ped}, and higher P_{ped} for a given J_{sat}

X-Divertors may widen the operating window for low-collisionality core scenarios

DIII-D NATIONAL FUSION FACILITY

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