For the 1st time, the XGC-M3Dc1 coupled extreme-scale simulation on Theta explains RMP-driven edge transport in realistic DIII-D edge plasma [Invited Talks: DPP19, IAEA20]

- Experimental puzzle: density pump-out, while confining electron heat → reduced fusion yield in ITER
- Study requires RMP + Neoclassical + electrostatic turbulence + neutral atoms, heat source
- Finds that turbulence + neoclassical together can explain the puzzle
- The new physics understanding opens the door to mitigation of density pump-out from ITER edge.