# Ideas for DIII-D National Campaign – LLNL collaboration

1. Radiative divertor and detachment using D_2 and CD_4 seeding in highly-shaped plasmas with I_p and P_{NBI} similarity to NSTX and NSTX-U.

2. Search for the snowflake divertor churning mode in high-triangularity plasmas with new Divertor Thomson System view.

3. Studies of heat transport in snowflake divertor via slow configurations scans.

4. Density control in snowflake-minus divertor configuration.

NSTX EFIT02 140433 0.746 s
DIII-D EFIT03 155479 4.588 s
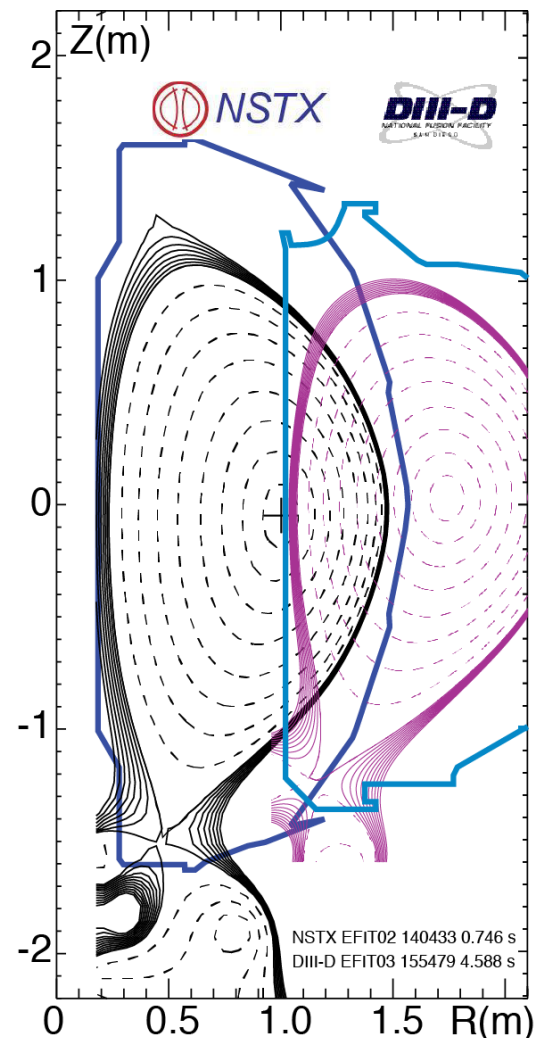
Cryo-pumped snowflake-minus divertor configuration is a candidate for NSTX-U high-power H-mode scenario

- NSTX-U 10-12 MW, 0.5 n_e/n_G plasmas

- (J. Canik, NSTX-U PAC31)
  - High flux expansion in SFD gives *better* pumping with SOL-side configuration
  - More plasma in far SOL near pump
  - More room to increase R_{OSP} at high I_p

- This experiment will attempt to establish divertor n_e, n_{sep}, n_{ped}, and neutral pressure trends in the snowflake-minus configuration for comparison with simple and UEDGE models.

SFD: R_{pump} = 0.72 m
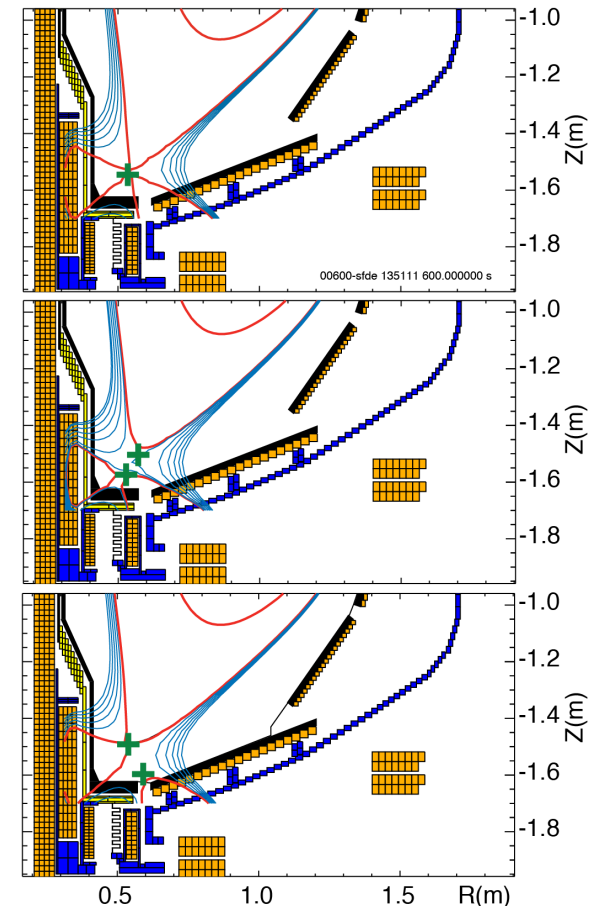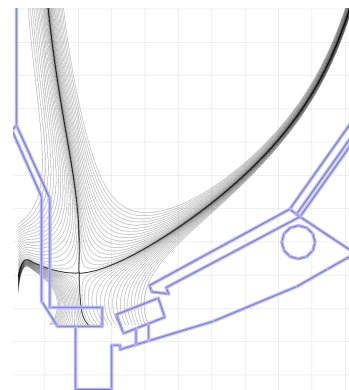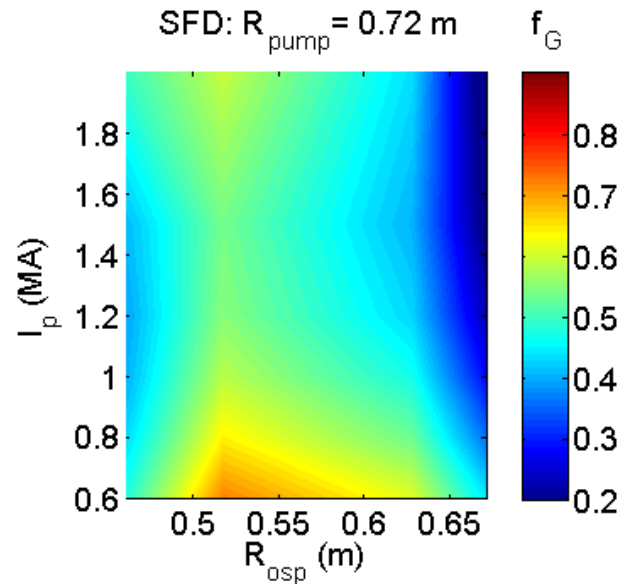
NSTX-U

Initial comparison between cryogenically pumped and unpumped snowfake divertor obtained

- **Strike-point geometries non-optimal for pumping**
  - 10 % effect on density

- **Future optimization desirable**

- **Important for NSTX-U divertor heat and particle control planning**

149736 - cryo on   149738 - cryo off

n_e (x10^19 m^-3)

149736
149738

P_NBI (MW)

snowflake

P_rad_div (MW)

q_peak (W/cm^2)

H_L89

H_89(y,2)

Time (ms)

MDSplus, shot = 149736, run = EFIT01, time = 2880.

MDSplus, shot = 149736, run = EFIT01, time = 4400.00

DIII-D NATIONAL FUSION FACILITY

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