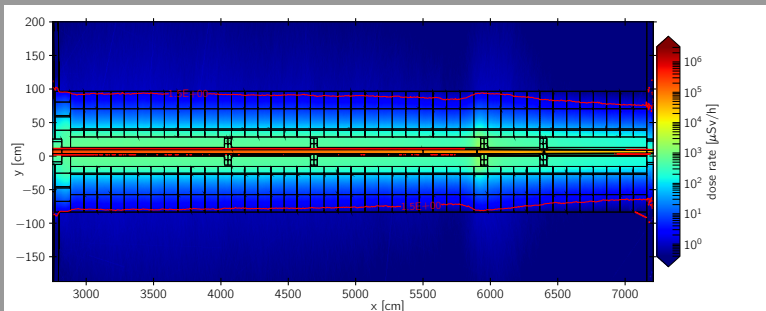
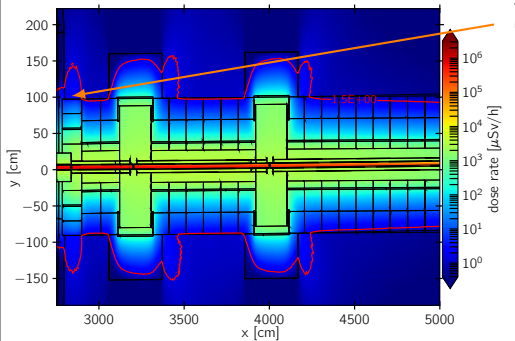


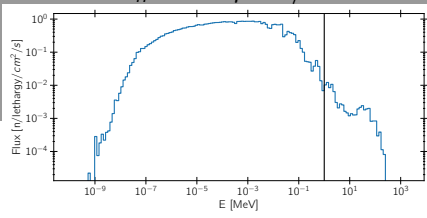
DREAM shielding - Radiation ( $n&\gamma$ ) dose map

- Standard configuration (thickness in cm in bracket):
  - ▶ Bunker insert: B4C (2) - Steel (20) - (B4C (2)) - HDConc (40)
  - ▶ B4C (2) - Steel (10) - (B4C (2)) - Reg-Conc (60)
- Collimators made by VOID

# TREX - Bunker Insert



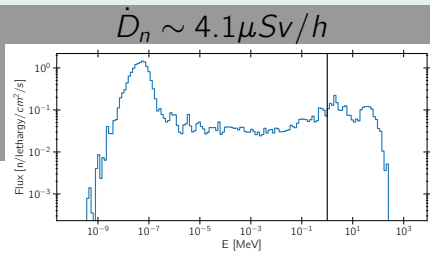
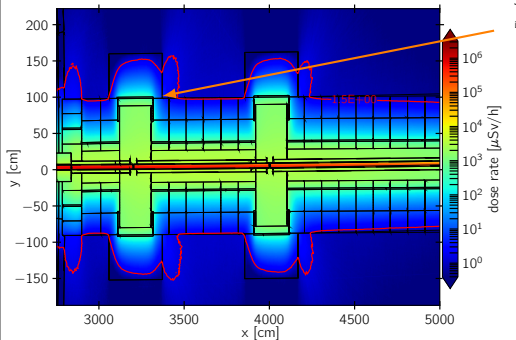
$$\dot{D}_n \sim 3.6 \mu\text{Sv/h}$$



- $\dot{D}_n \sim 3.5 \mu\text{Sv/h}$ ,  $E_n < 1 \text{ MeV}$
- $\dot{D}_n \sim 0.1 \mu\text{Sv/h}$ ,  $E_n \leq 1 \text{ MeV}$

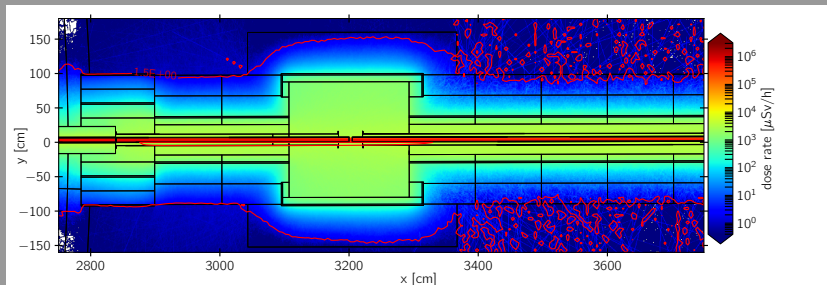
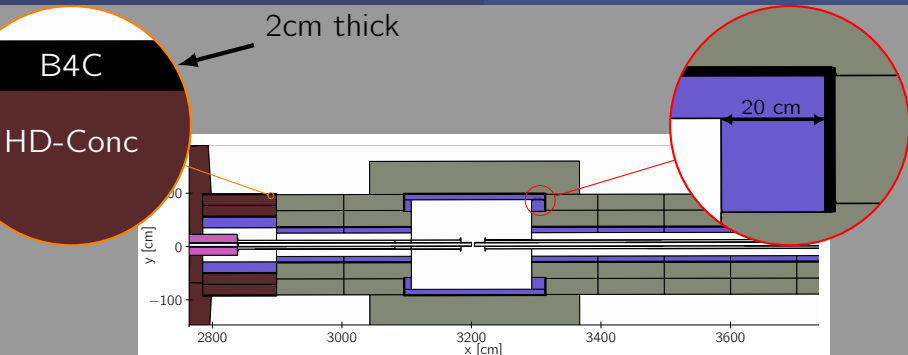
Boron outer layer needed

# TREX - Chopper Pit



- $\dot{D}_n \sim 1.5 \mu\text{Sv/h}$ ,  $E_n < 1 \text{MeV}$
- $\dot{D}_n \sim 2.6 \mu\text{Sv/h}$ ,  $E_n \leq 1 \text{MeV}$

Thicker steel layer



# Conclusion

Based on simulations for DREAM and TREX:

- Bunker insert: B4C (2) - Steel (20) - (B4C (2)) - HDConc (40) - B4C (2)
- Main part: B4C (2) - Steel (10) - (B4C (2)) - RegConc (60)
- Chopper pit within LOS, steel thicknesses:
  - ▶ upstream beam side: 10 cm
  - ▶ downstream beam side: 20 cm