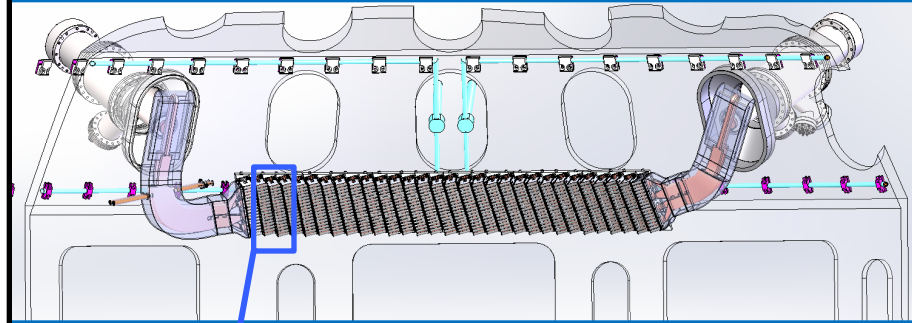


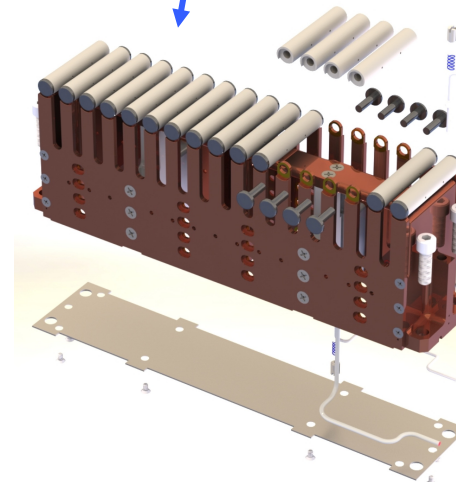
DIII-D High Power Helicon Current Drive (HPHCD) Program

Summary

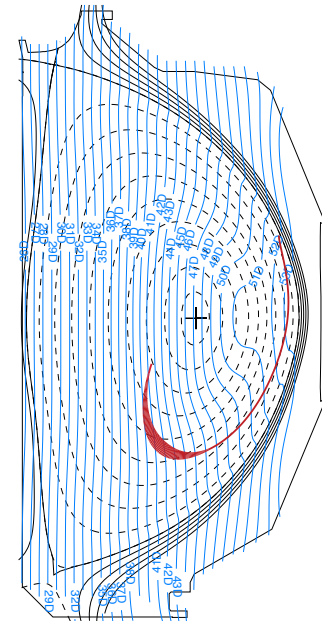
- ‘Helicon’ waves (fast wave in the lower hybrid range of frequencies, aka ‘whistler’) can drive current in high-beta plasmas with
 - Excellent lower-hybrid-like efficiency
 - Better penetration to core
- Tokamak reactor needs efficient current drive in *mid-radius* region
- Other rf methods (LHCD, ECCD, lower frequency FWs) have difficulties for this particular region of a reactor plasma
- Helicon is a promising method for current drive in the mid-radius region in a reactor
- DIII-D has demonstrated full single-pass absorption at mid-radius with low power helicon combline antenna with high beta target plasmas
- DIII-D has further developed and will test high power (1MW) comb-line traveling wave antenna.
- DIII-D intends to establish the physics of current drive with helicon/whistler/FW in LHRF in tokamak



HP Helicon antenna in DIII-D



Helicon antenna module, one of thirty of antenna assembly



Helicon off-axis current drive simulation in DIII-D AT discharge