

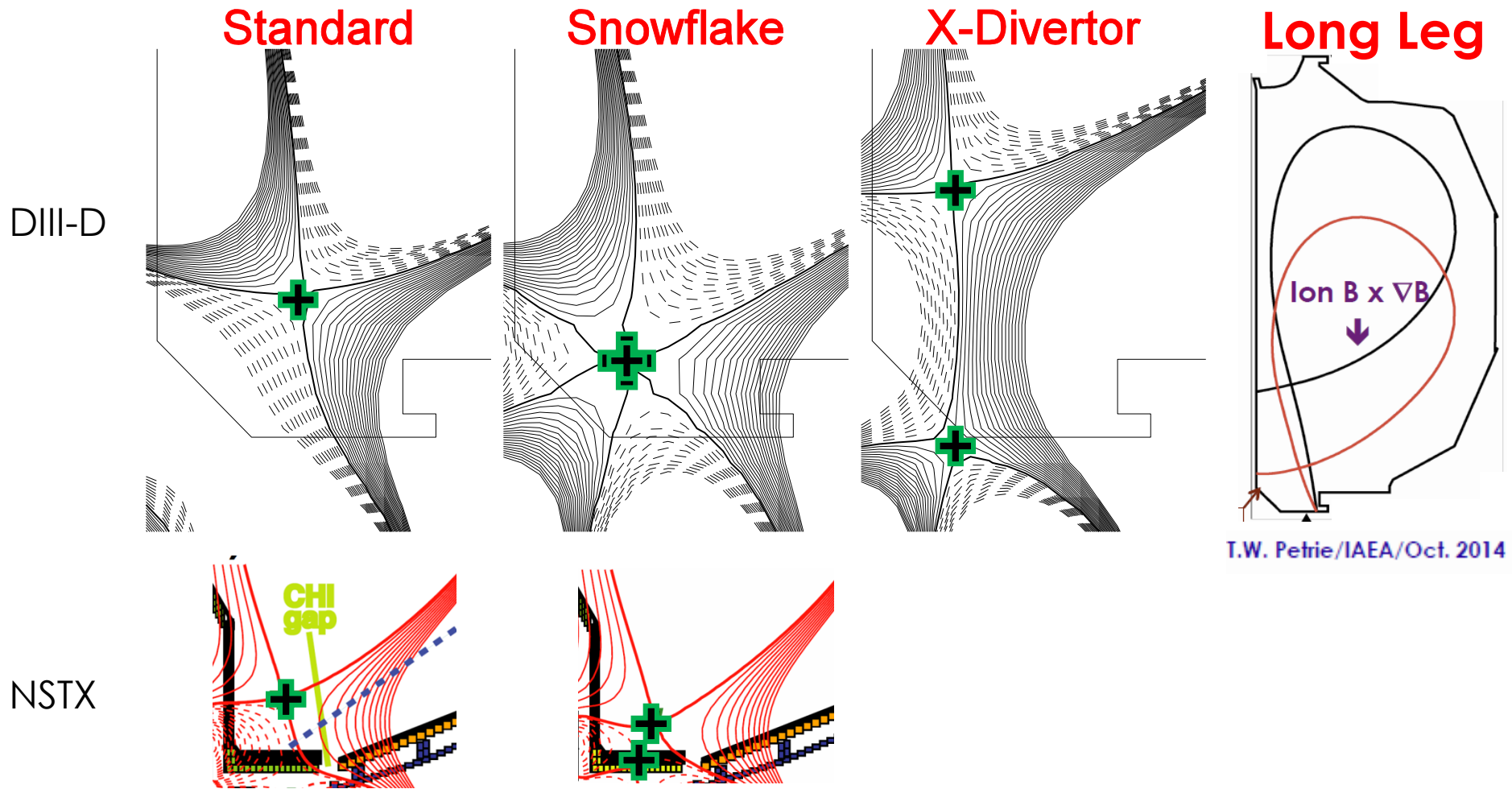
Detachment Comparison Study for Snowflake, X-Divertor, Standard Divertor and Long/Short Divertor Leg

D. Eldon, E. Kolemen, T.W. Petrie
NSTX-U Research Forum
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Motivation

- **Divertor detachment is essential for burning plasma operation in AT based fusion reactors**
 - Reduction in heat flux to the divertor target plates
- **Characteristics of detached plasmas vary with divertor configuration**
 - Heat flux before and after detachment
 - Impurity accumulation and radiation profiles
- **Relationship between core parameters and divertor heat flux depends on divertor config., leg length**
- **Which divertor configuration is optimal for detached operation? For integration with AT core plasma?**

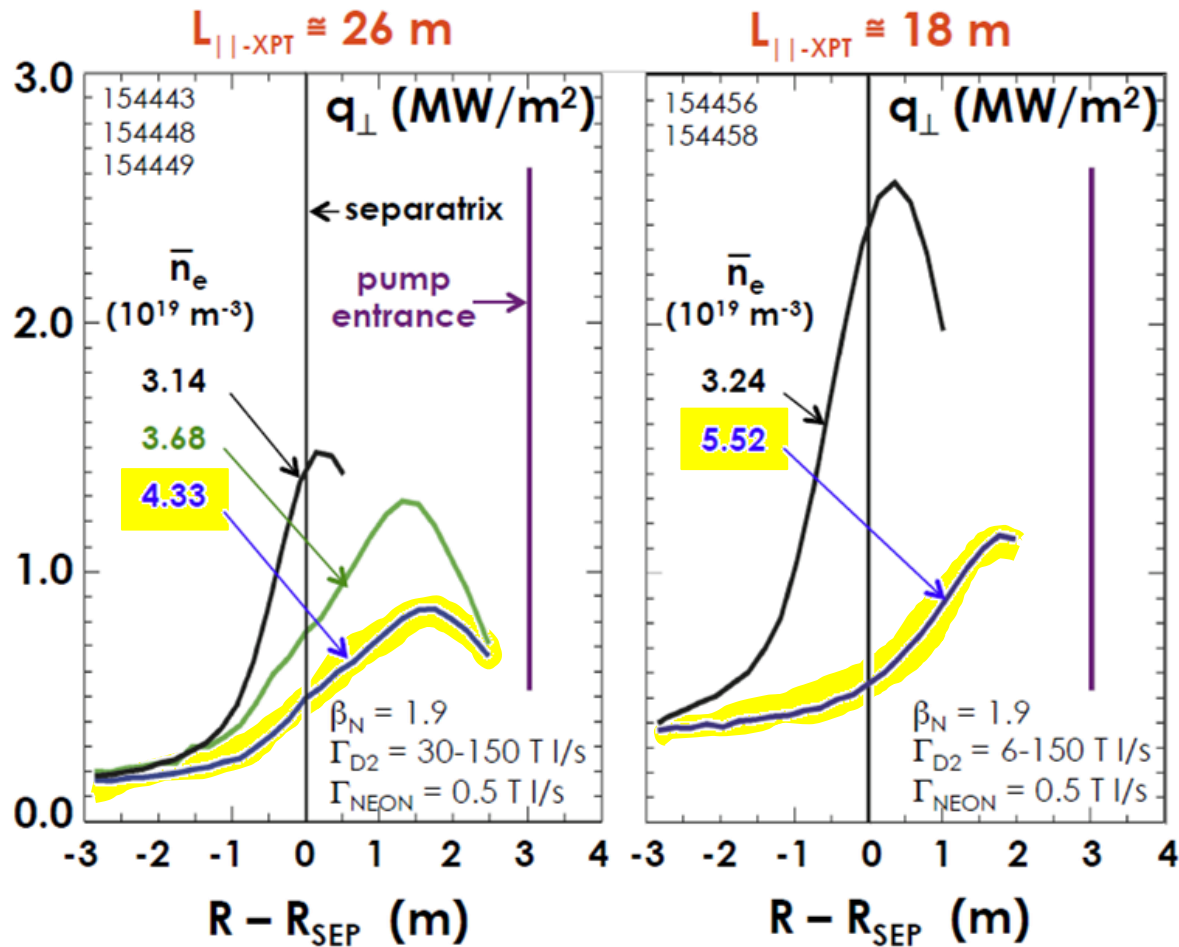
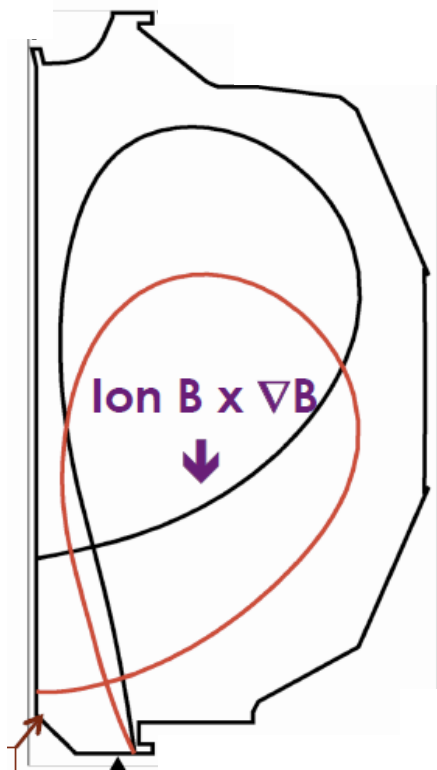
Divertor Configurations to be Compared in Detachment



T.W. Petrie/IAEA/Oct. 2014

V.A. Soukhanovskii, et. al., Nucl. Fusion 51 (2011) 012001

Long Outer Divertor Leg Results in Heat Flux Reduction at Lower Core Density



T.W. Petrie/IAEA/Oct. 2014

Plan: Characterize Detachment for Different Divertor Configurations

- **Density threshold for detachment**
- **Behavior around marginal detachment**
- **Heat flux profiles vs. density while detached**
- **Difference in heat flux between attached/detached**
- **Impact on pedestal and core performance (ped. height, global β , confinement time, etc.)**
- **Compare to DIII-D and model results**