

Coil Configuration Status

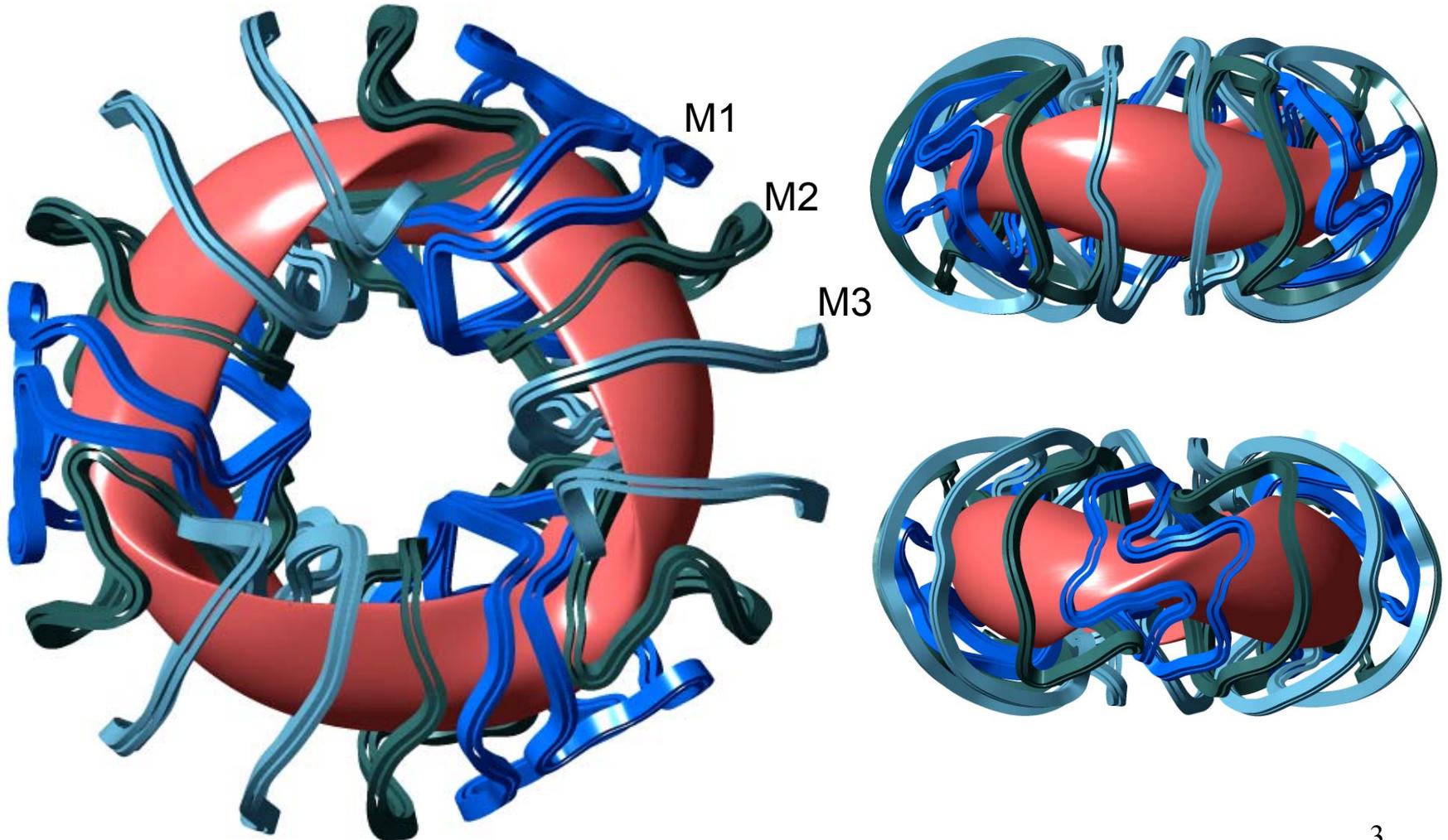
D. Williamson
NCSX Project Meeting
8/28/2001

Goals since last Project Meeting

- Model 18 modular coil configurations, assess engr metrics
- Resolve ProE / CoilOpt bend radius differences
- Improve modular coil twist, incorporate integral shell
- Evaluate TF coil options (access, structural arrangement)

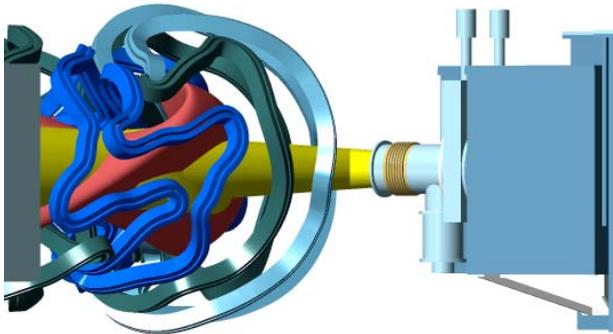
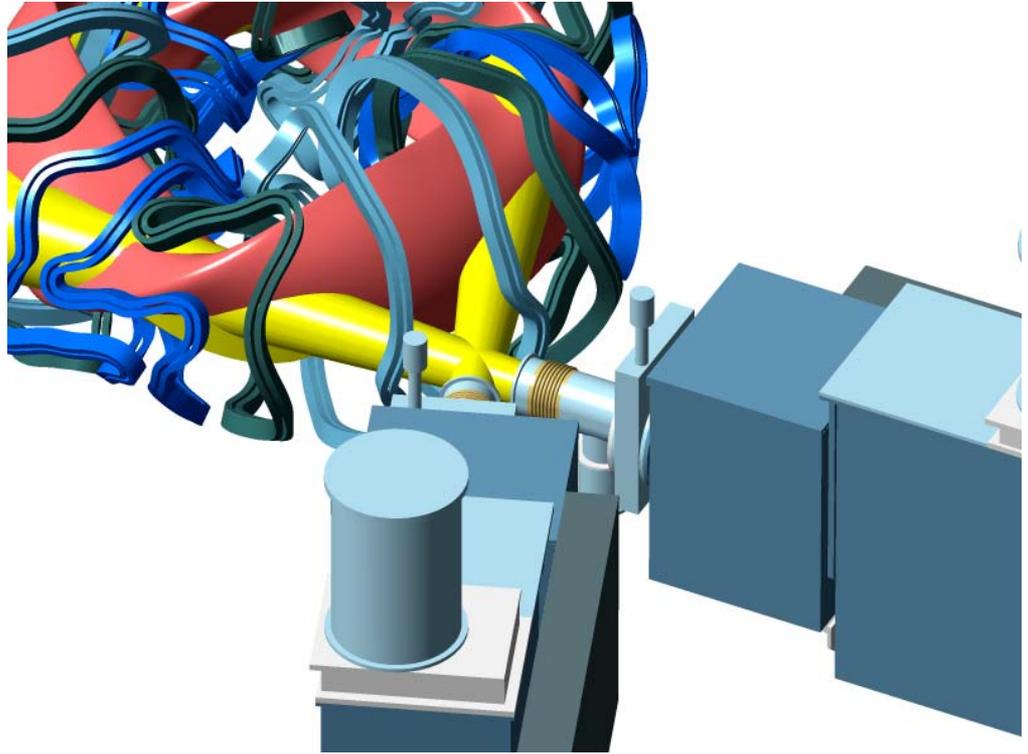
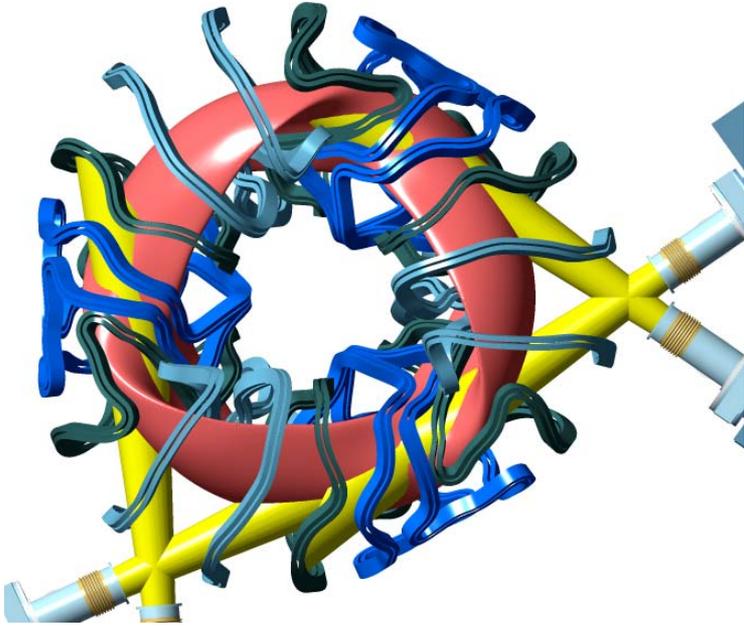
Modular Coil Case 0813a1 (3 coil types, 18 total)

- Min coil-plasma distance = 19.7-cm
- Min coil-coil distance = 11-cm
- Min bend radius = 9.1-cm (ProE), 9.2-cm (CoilOpt)



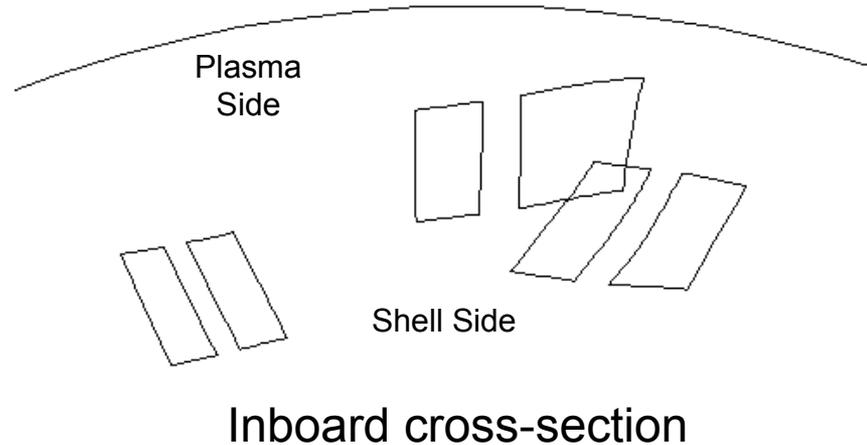
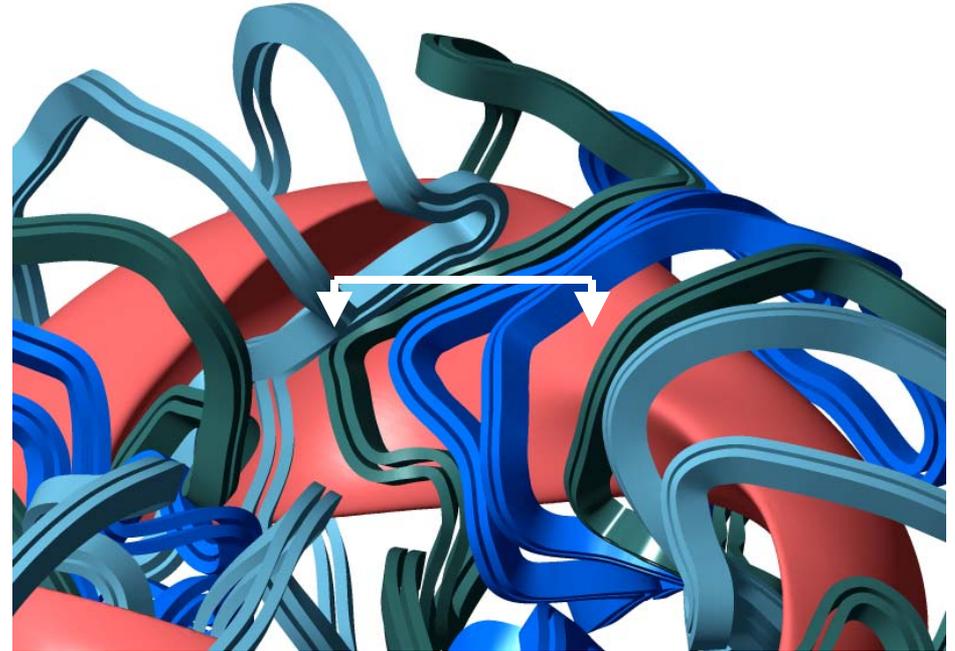
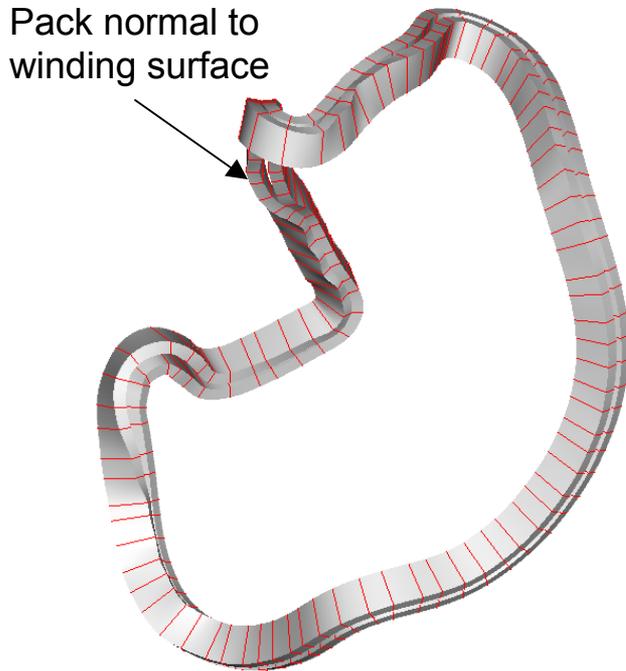
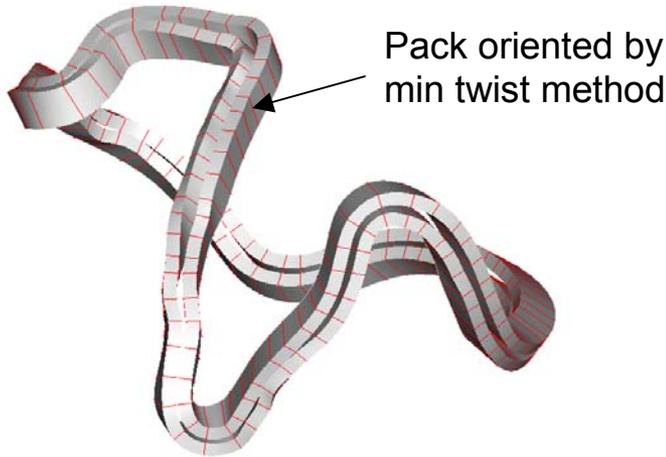
Neutral Beam Access for Case 0813a1

- Min coil-NB distance = 30.5-cm



Coil Shape / Twist is Improving

- Method for local alignment to structure has been developed
- Main issue is inboard overlap - coils can not “see” shell structure



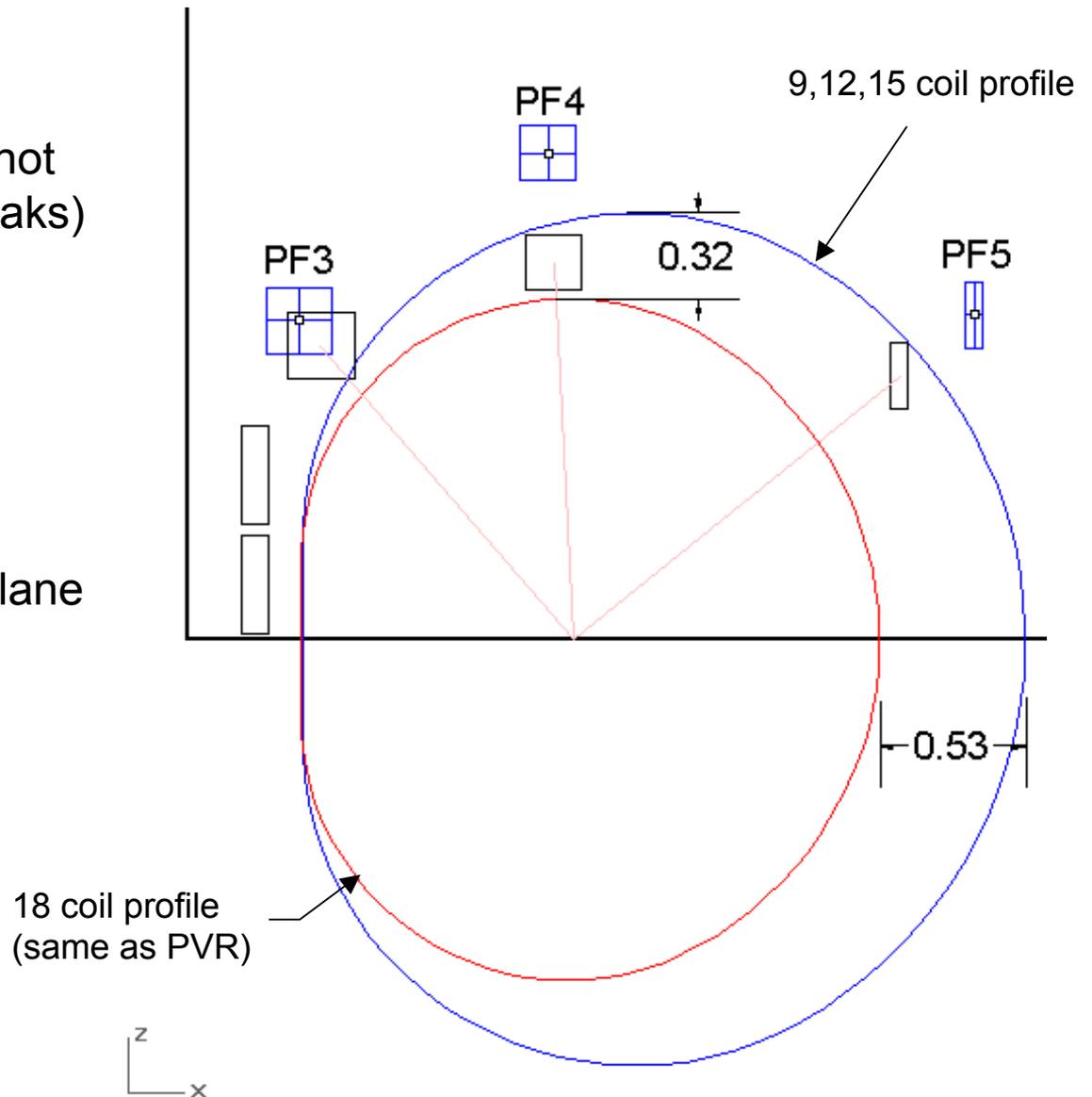
TF / PF Coil Options

18 coils, axisymmetric
- smaller profile (if TF not aligned with shell breaks)
- very low ripple

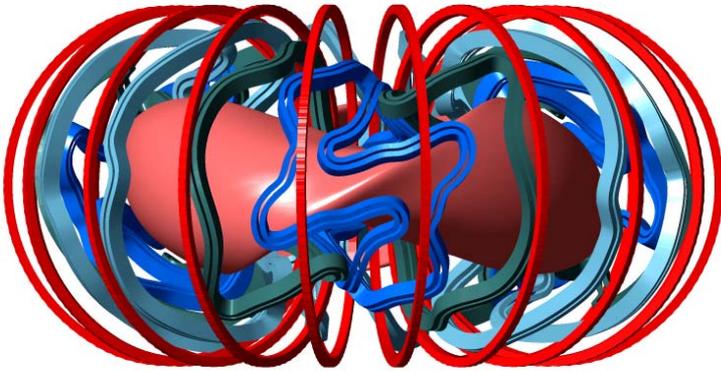
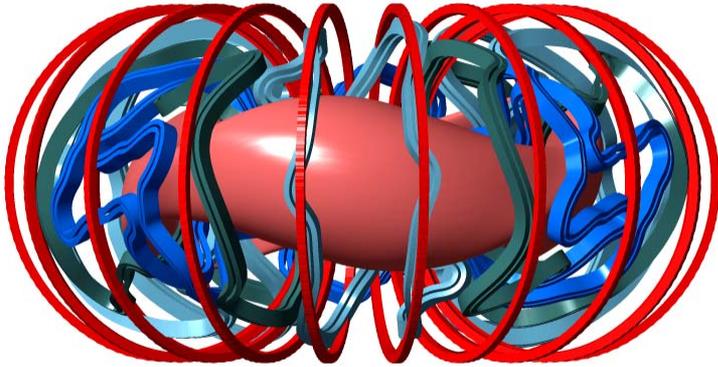
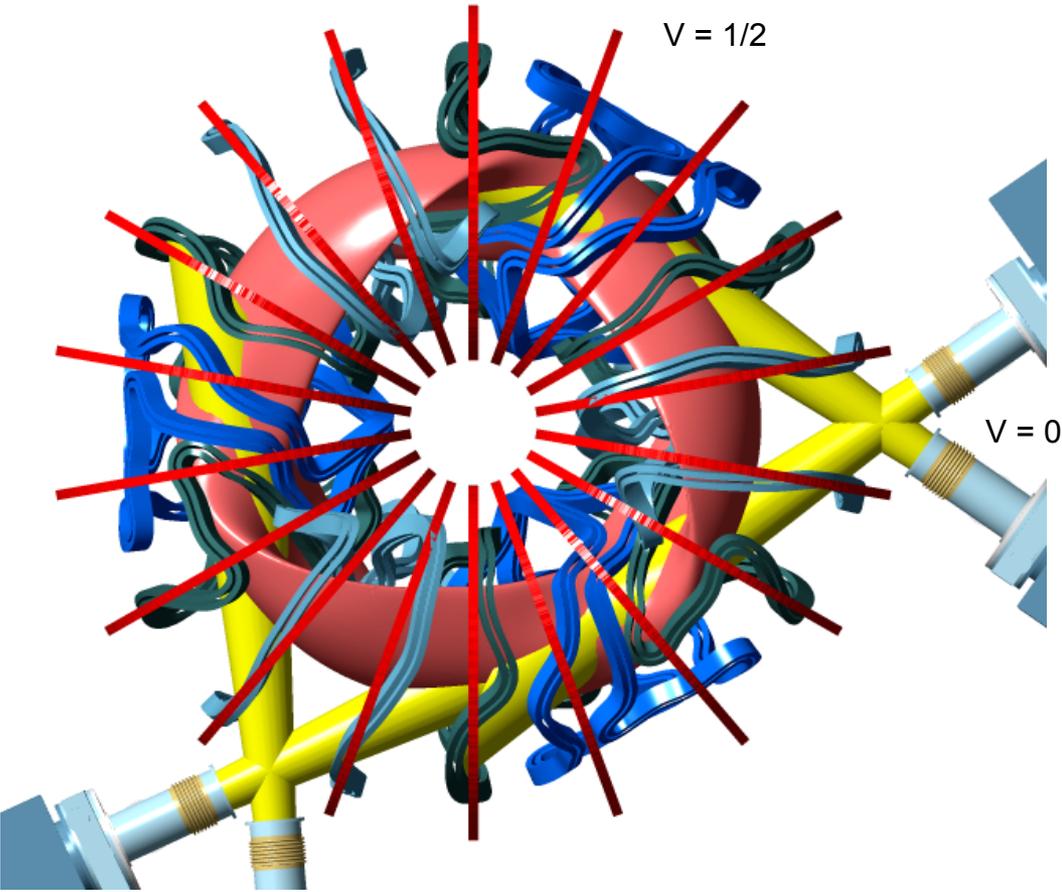
15 coils, helical axis
- smallest coil profile
- flexibility

12 coils, split on $v=0.5$ plane
- good access

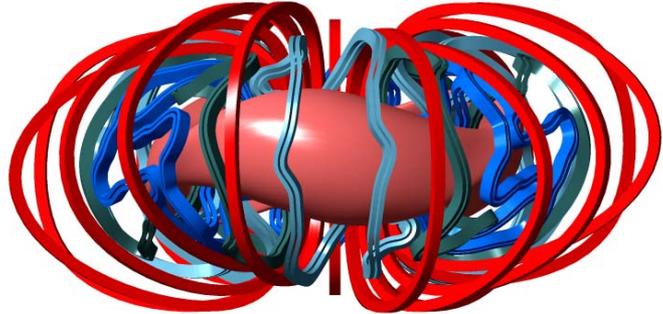
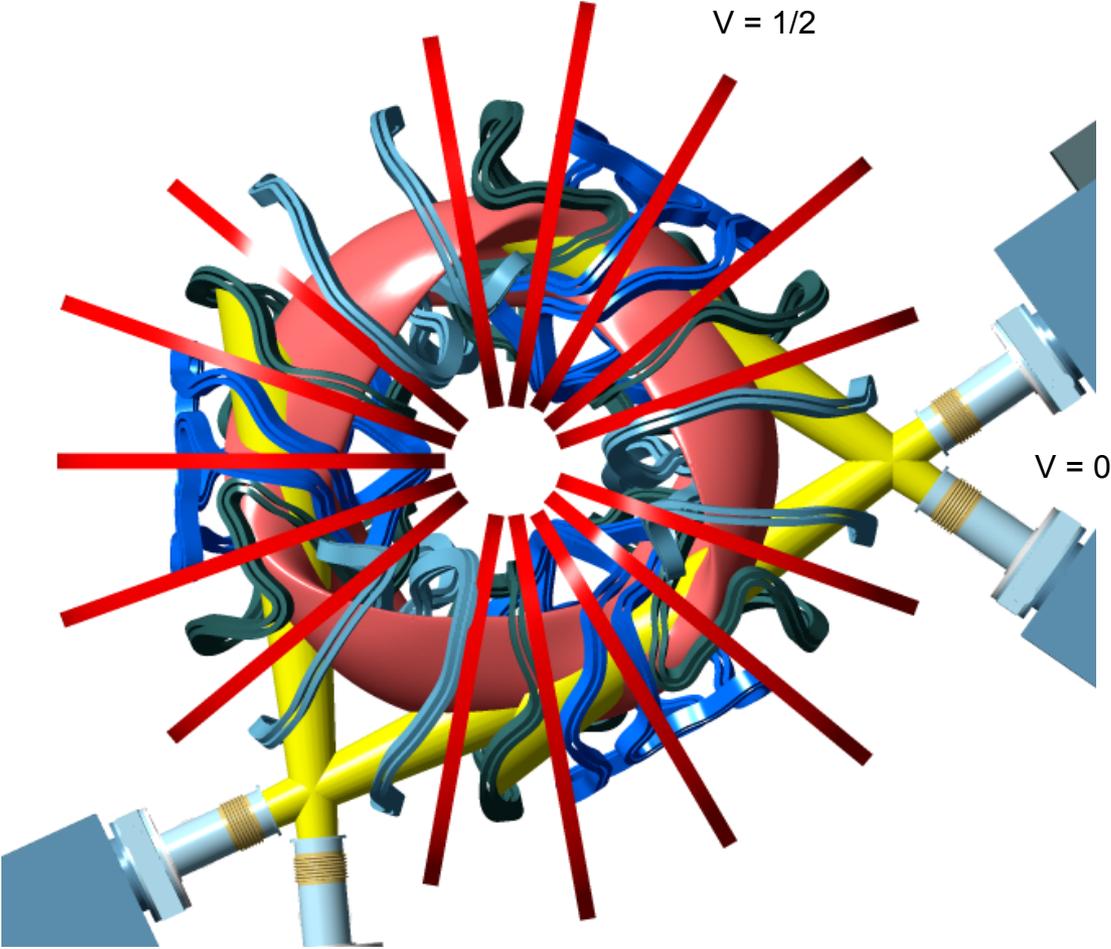
9 coils, axisymmetric
- good access



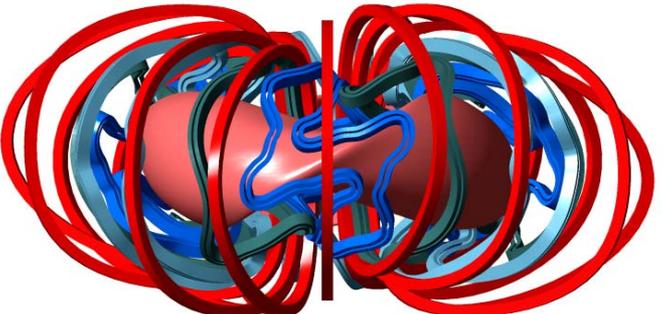
18 TF Coil Option



15 TF Coil Option

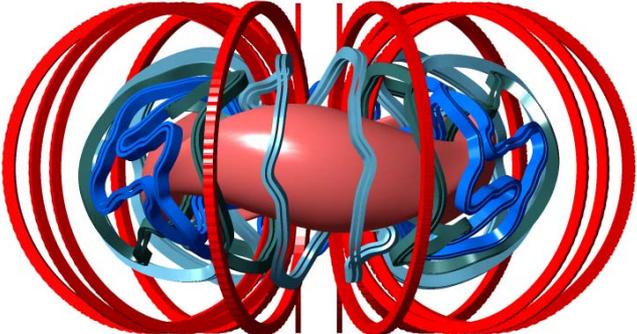
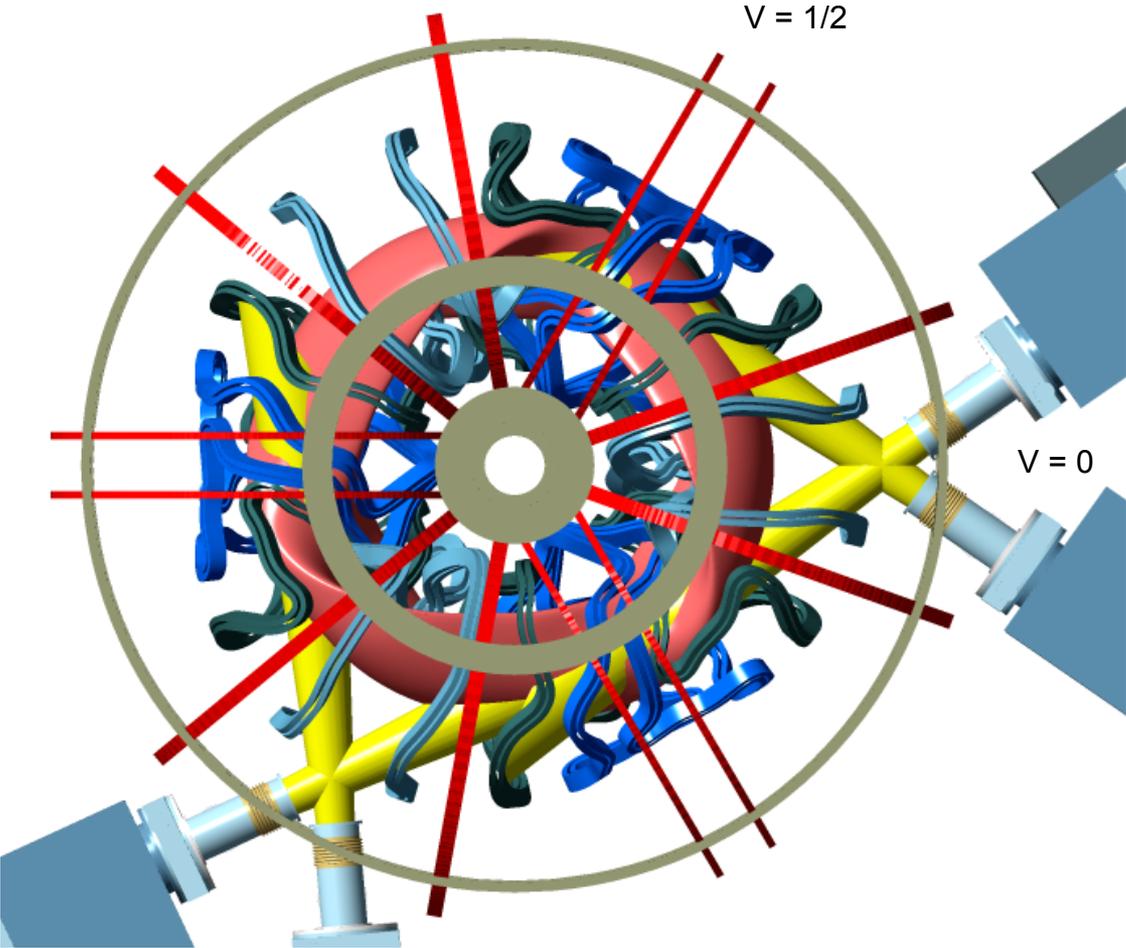


$V = 0$

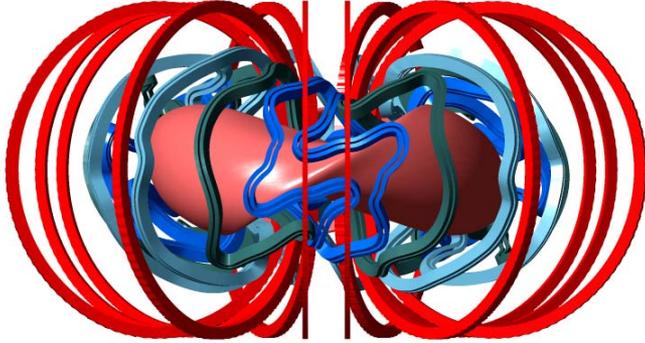


$V = 1/2$

12 TF Coil Option (split on $v=0.5$)

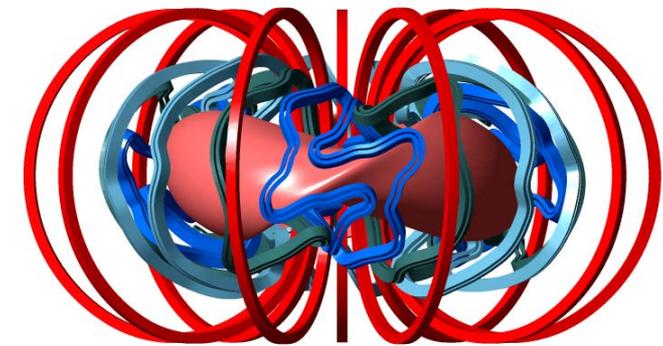
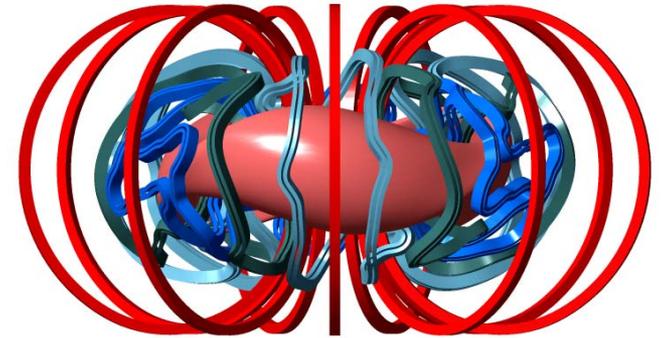
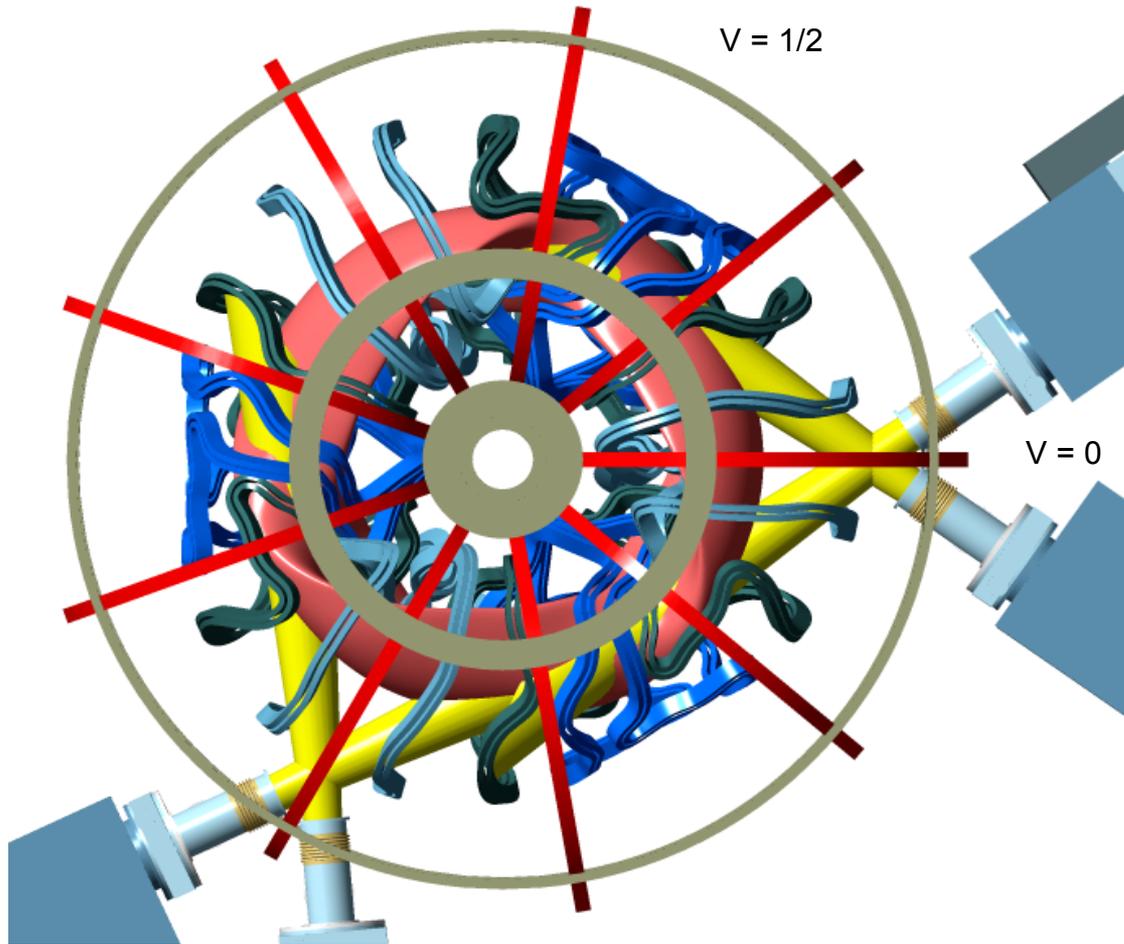


$V = 0$



$V = 1/2$

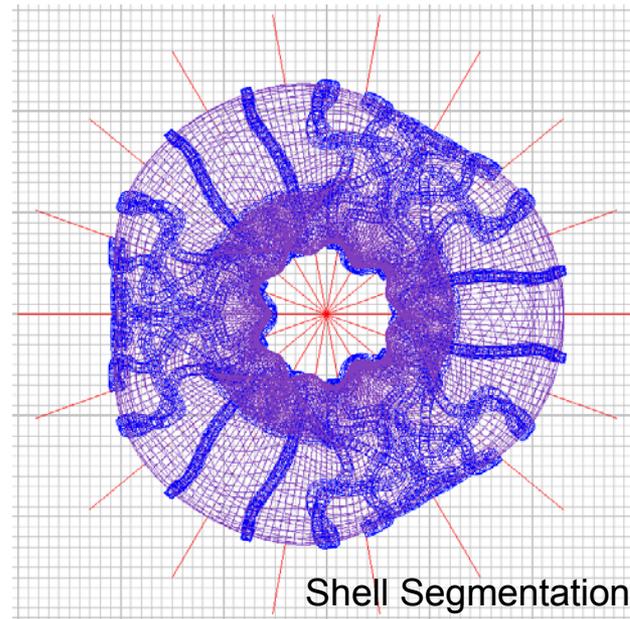
9 TF Coil Option



Summary / Plans

Modular Coils

- Modular case 0813a1 appears to meet all engr metrics (separation distance, radius of curvature, access requirements)
- Main issue is overlap when coils are twisted to fit the shell structure
- A smoother winding surface or some overlap constraint is needed
- Another priority is the development of an integral shell / tee model for use in manufacturing studies



Summary / Plans

TF / PF Coils

- All of the TF coil options appear feasible as machine configuration
- Larger TF profile impacts location of PF3,4,5. Proposed locations are shown in the Table
- Plan to continue assessment of structural configuration, diagnostics access for the different options

