QOS Coil Flexibility

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QOS Project Meeting

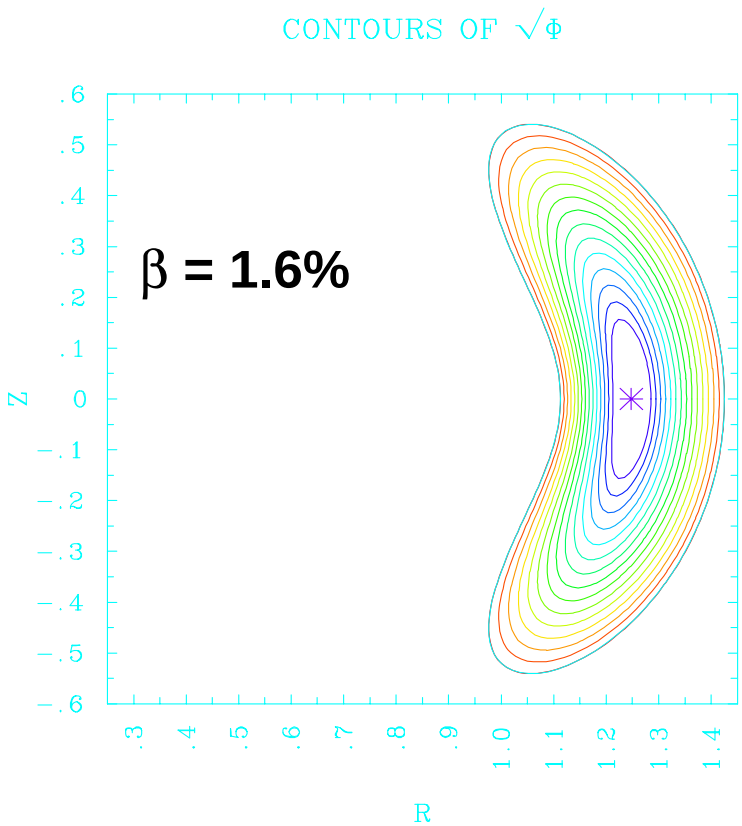
Sept. 19, 2000

Topics

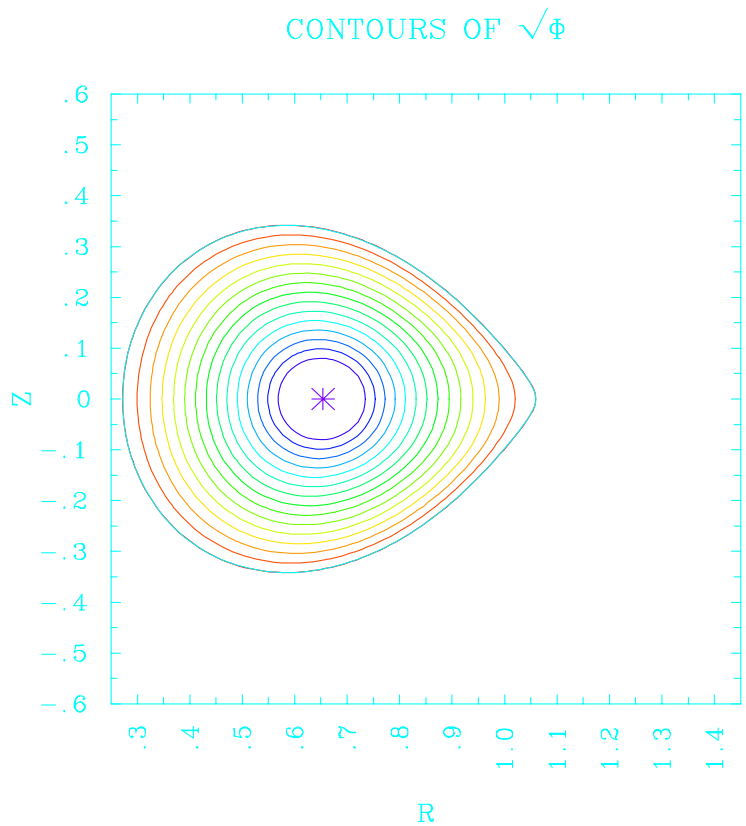
- **Flux surfaces at β = 1.6%**
  - **VMEC fixed boundary surfaces**
  - **PIES fixed & free boundary surfaces**
- **Change in vacuum flux surfaces from**
  - **B_T 1/R field**
  - **not energizing different coils**

A2.5 Flux Surfaces

0°



90°

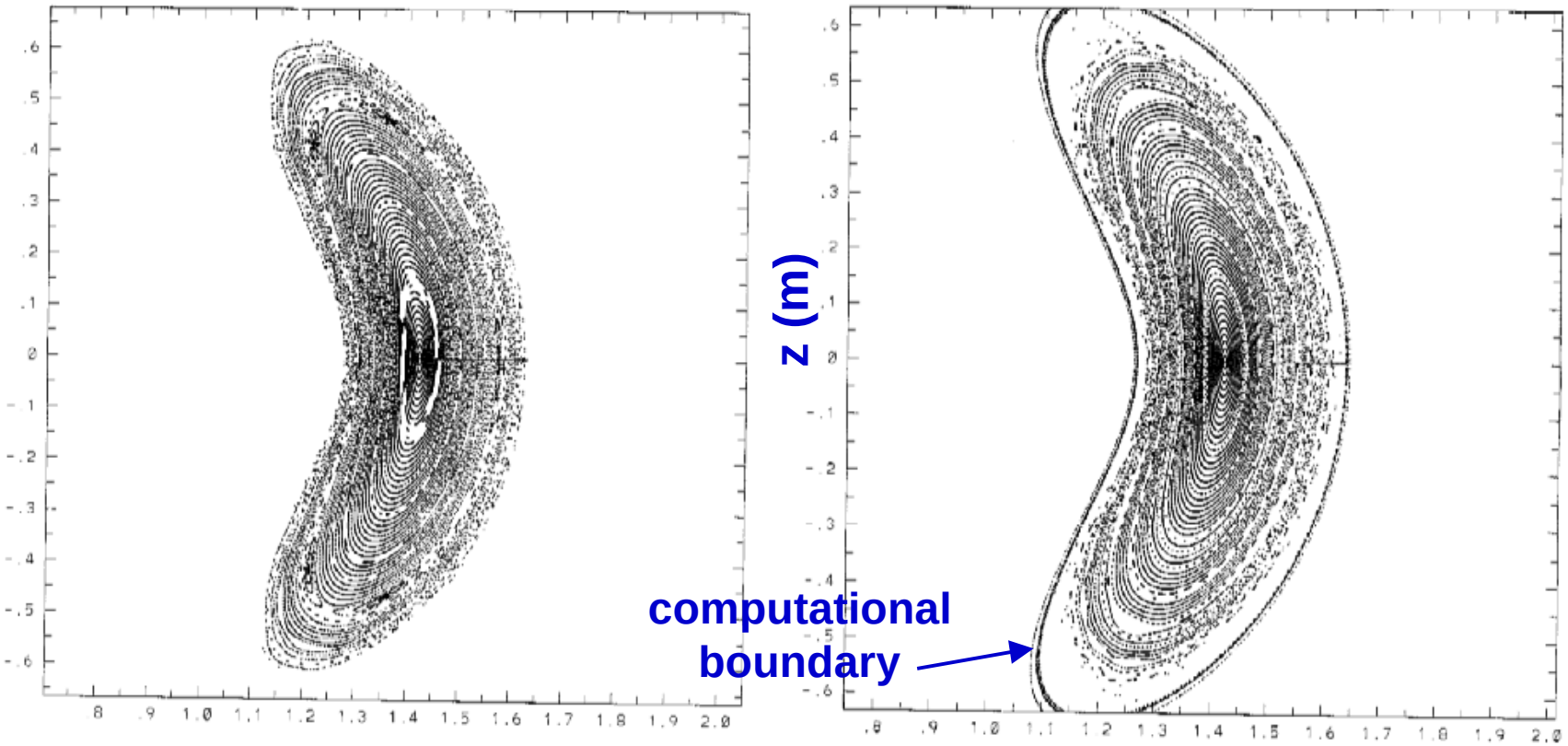


Assumes flux surfaces (VMEC), fixed boundary

D. Spong

PIES Flux Surfaces at β = 1.6%

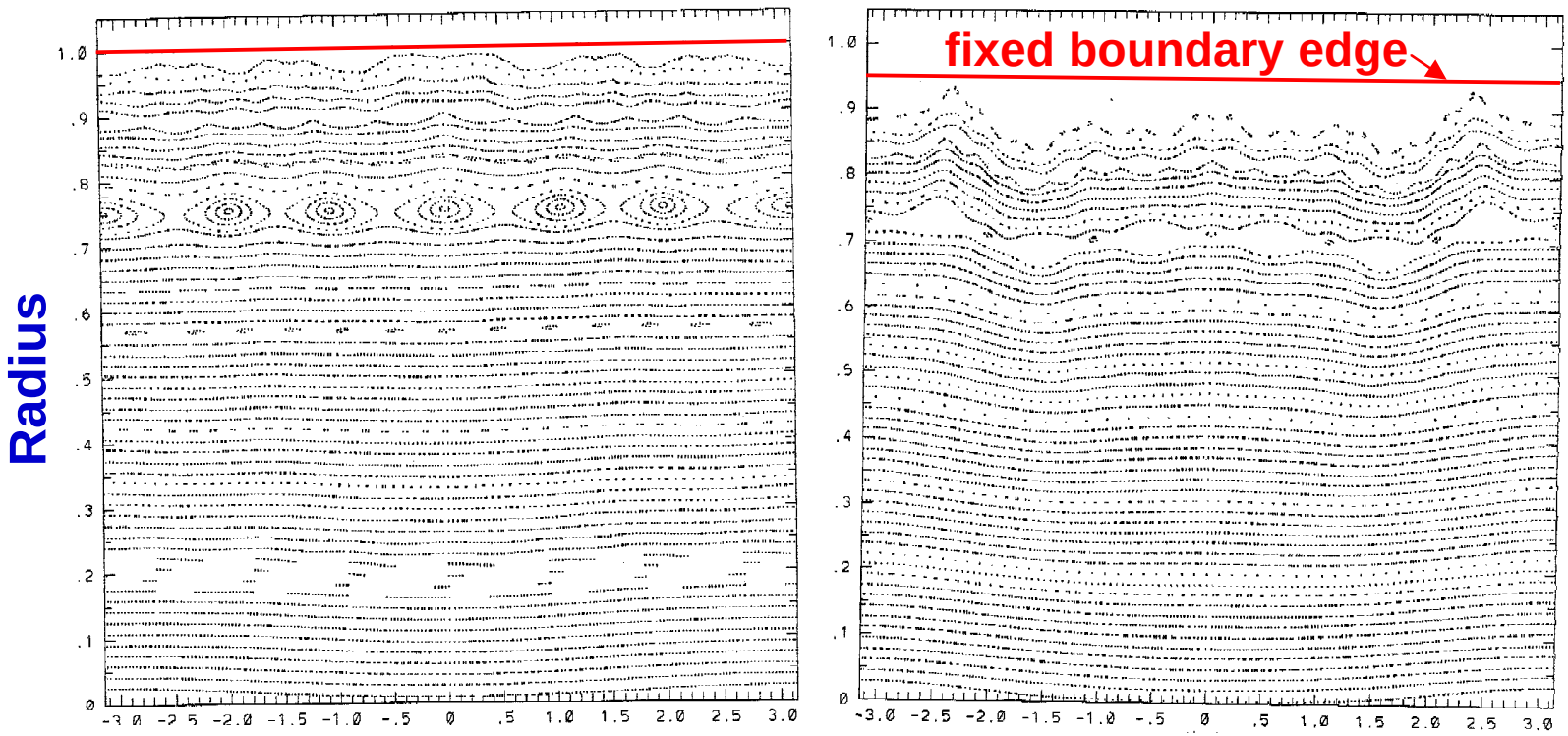
Fixed Boundary **Free Boundary**



D. Monticello

PIES Flux Surfaces at β = 1.6%

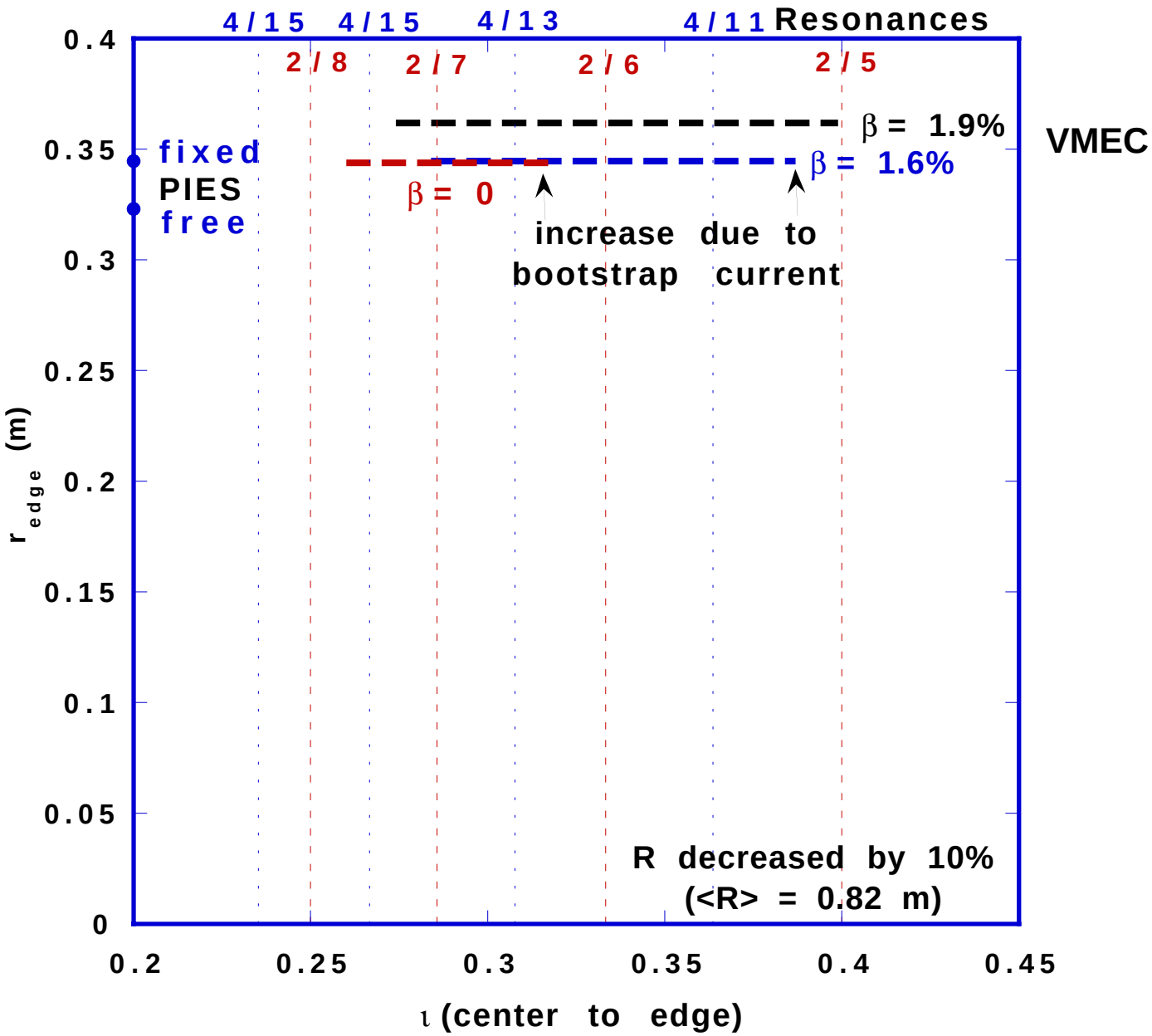
Fixed Boundary **Free Boundary**



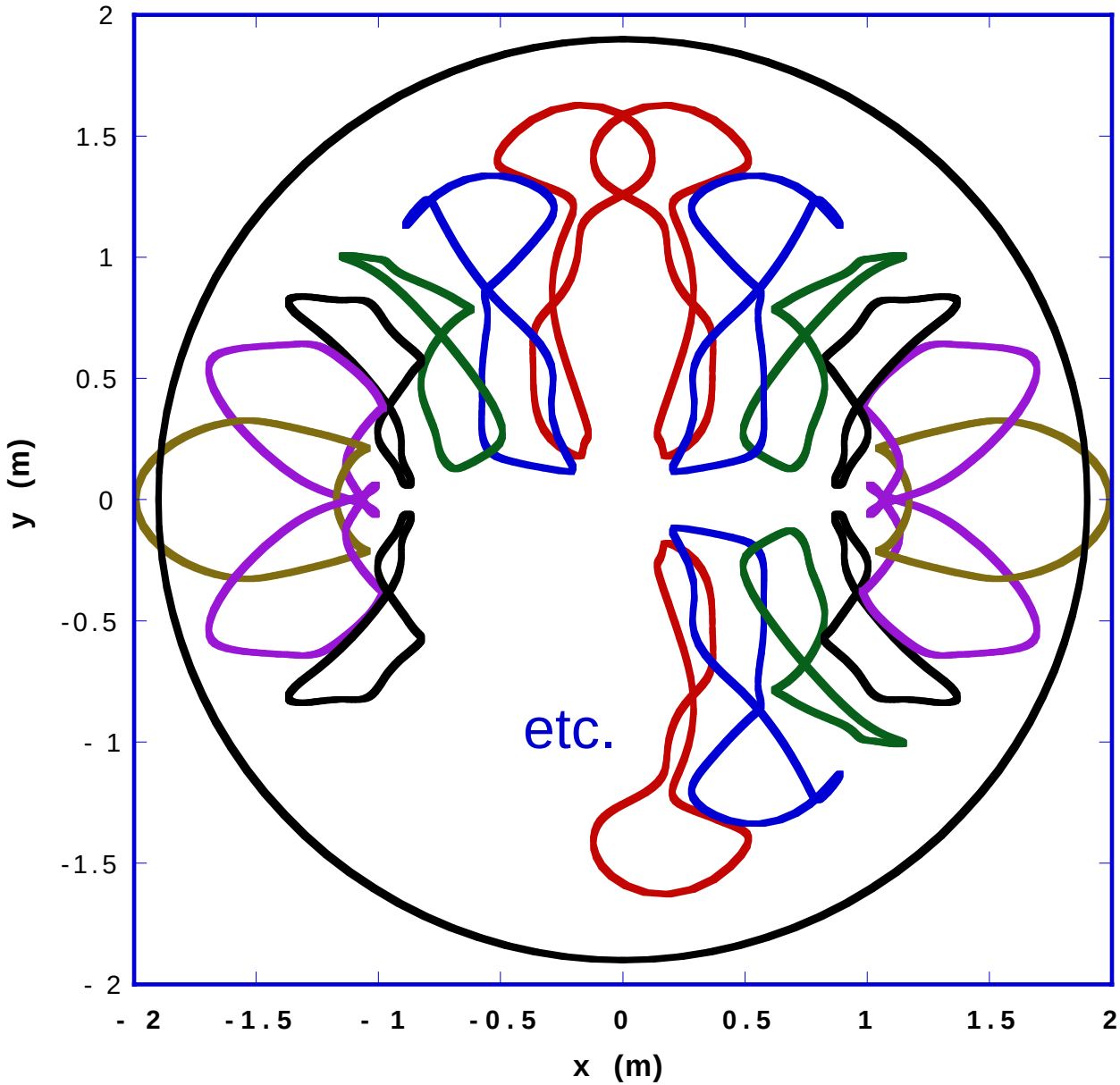
- **Island suppression due to bootstrap current not included yet**

D. Monticello

Two Field Period A = 2.5 Case

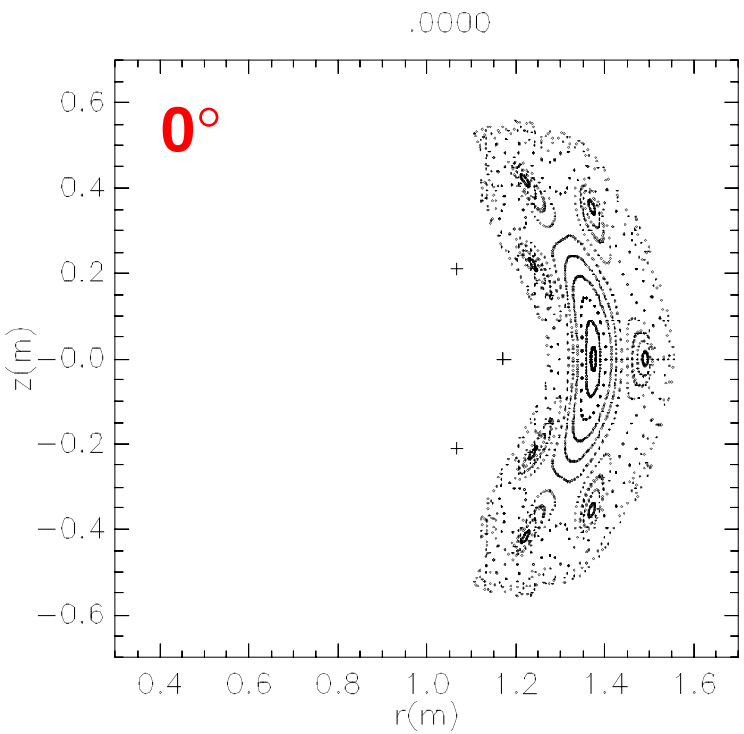


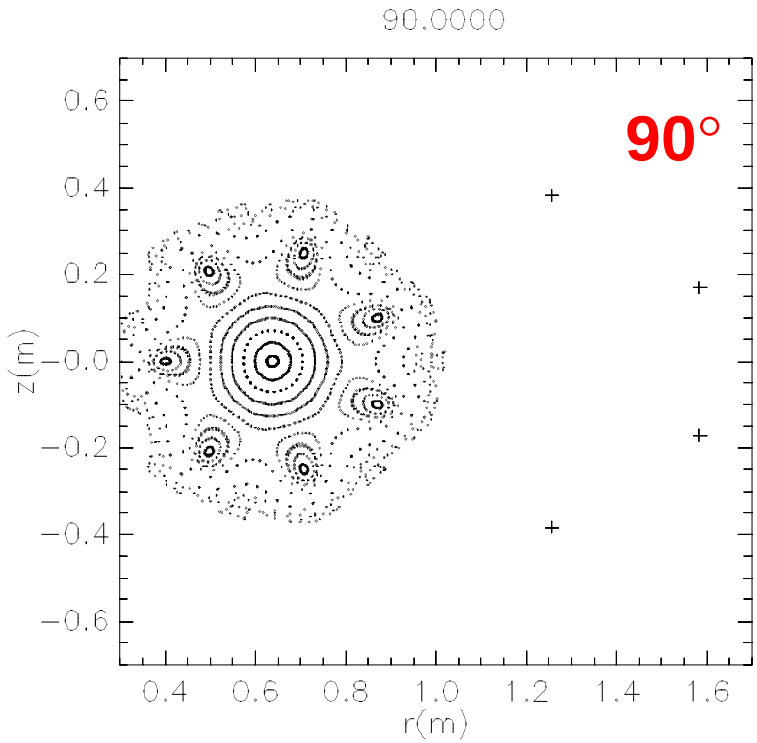
Top View of A2.5 Coil Set



All calculations are for coils reduced by 10% to fit in ORMAK tank

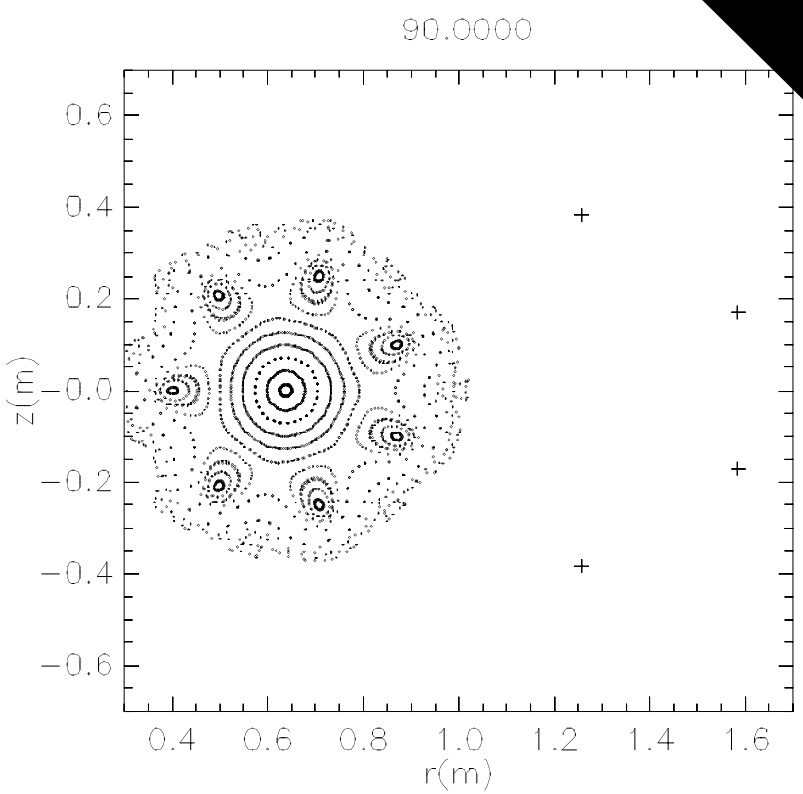
A2.5 with $B_T = 0$

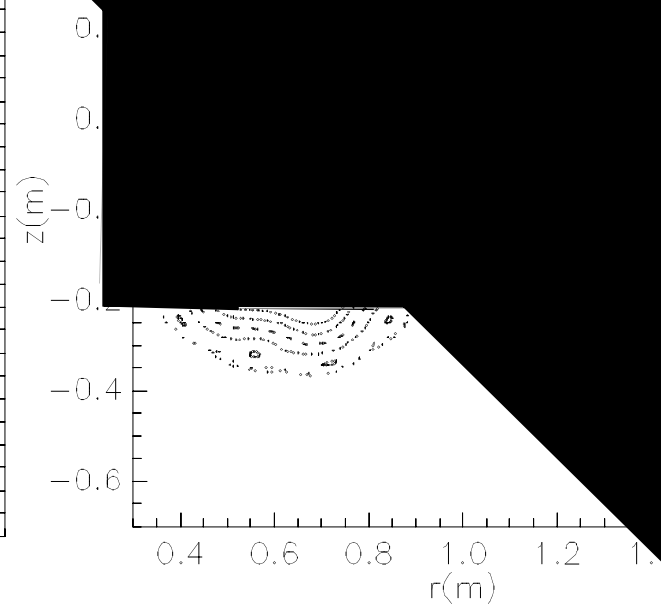




2/7 islands reduce useful plasma volume

A Smal
Cures





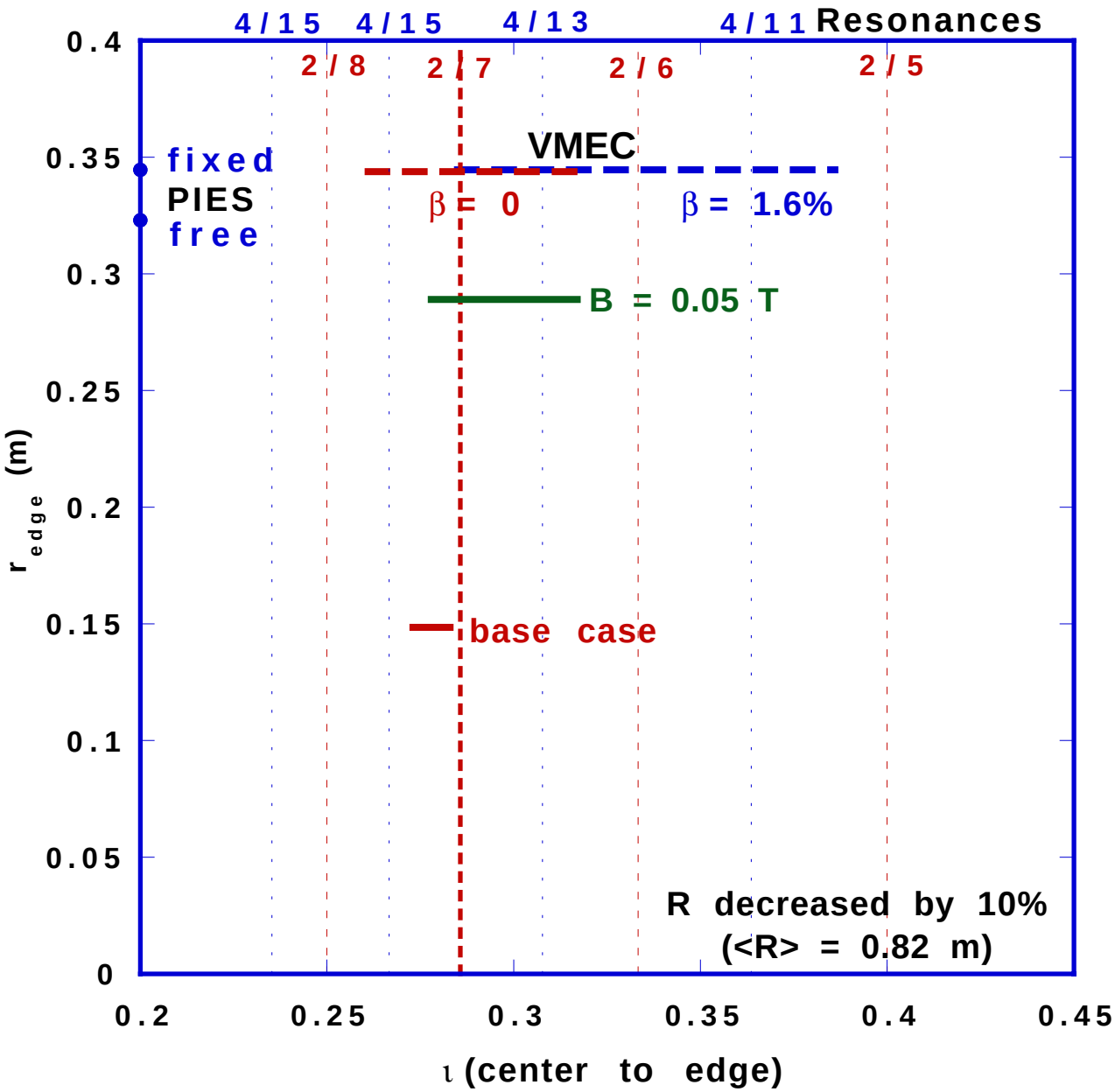
$_T$ = 0, a = 15 cm

$_a$ = 0.283, Δ

B

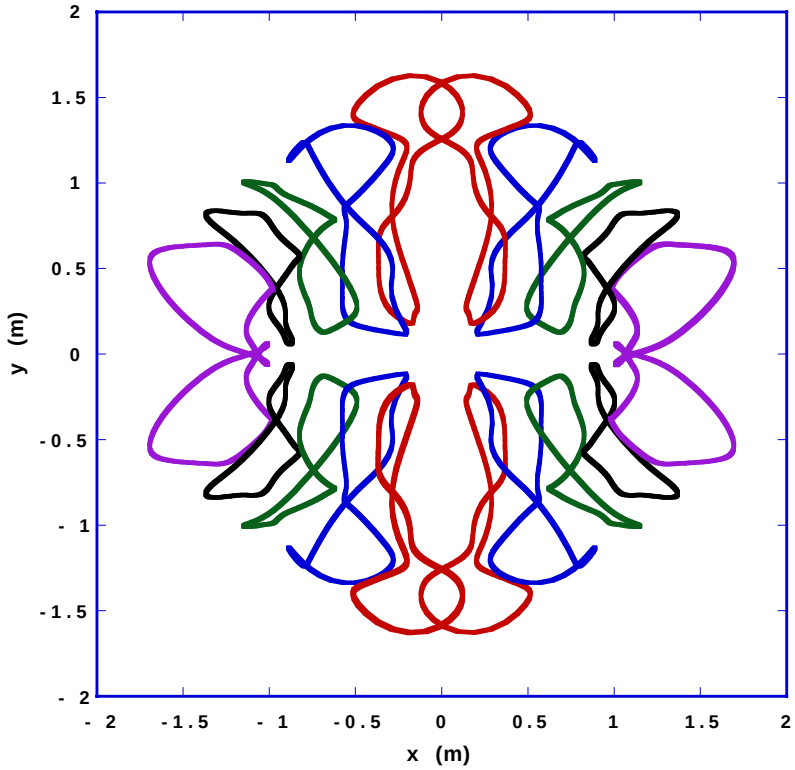
$_a$ = 0.317, Δι

Two Field Period A = 2.5 Case

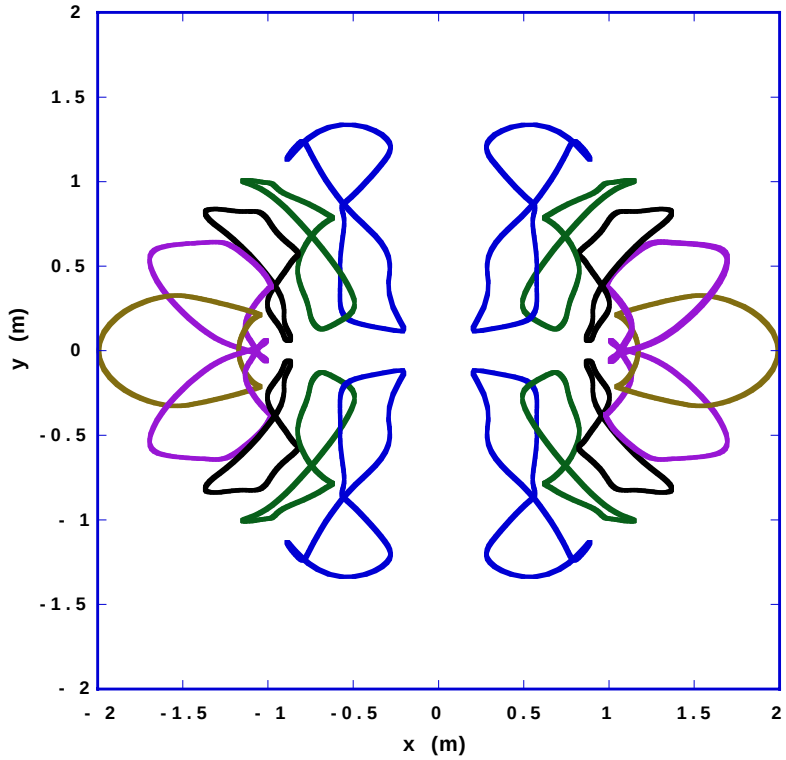


Modified A2.5 Coil Sets

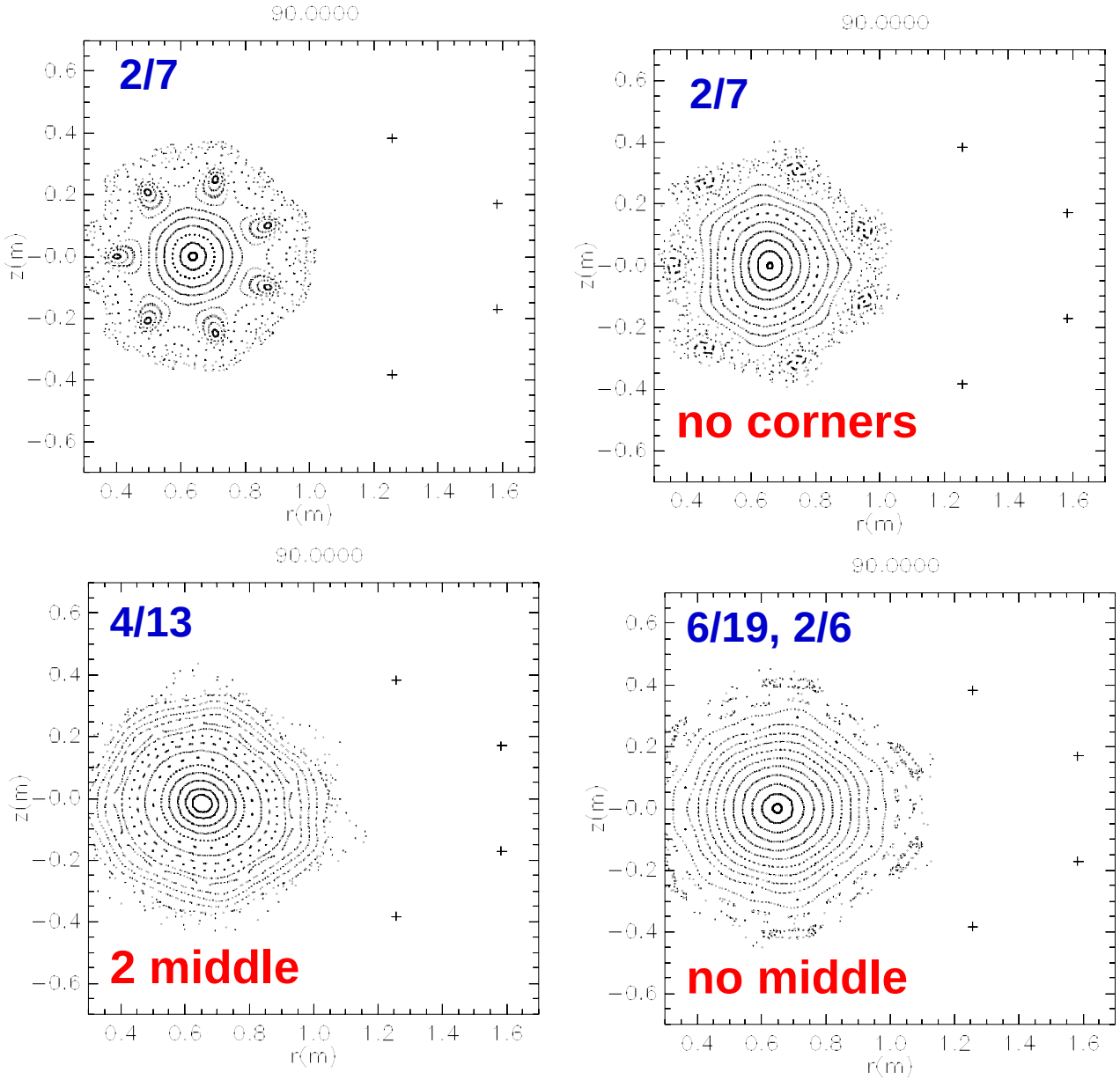
No current in corner coils



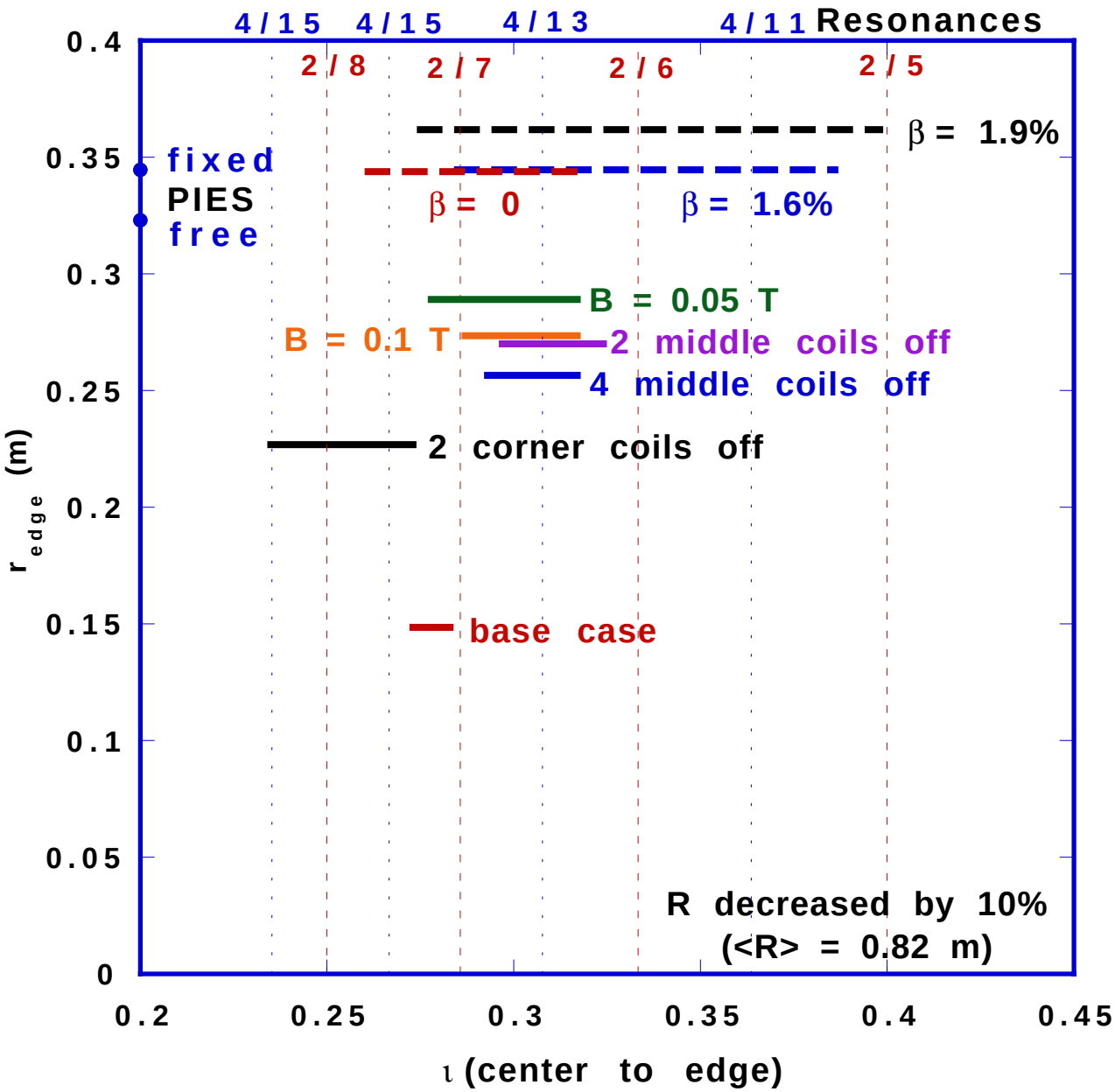
No current in middle coils



A2.5 with Different Coil Currents



Two Field Period A = 2.5 Case



Summary

Changing B_T (1/R field) and modular coil currents in QOS allows

- **Repairing outer surfaces due to islands**
- **Changing the aspect ratio a factor of 2**
- **Using magnetic islands to bound the plasma, or for island divertor studies**

Realistic discrete TF coils and VF coils are being added for flexibility studies