

Control of ELMs with edge resonant perturbations on COMPASS-D

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Outline

- Aim

- to test whether edge resonant magnetic perturbations can change or trigger ELMs

- Use high mode number RMP configuration:

$m,n = 6,1$ 0.4 G/kA

$m,n = 5,1$ **1.0 G/kA**

$m,n = 4,1$ **1.5 G/kA**

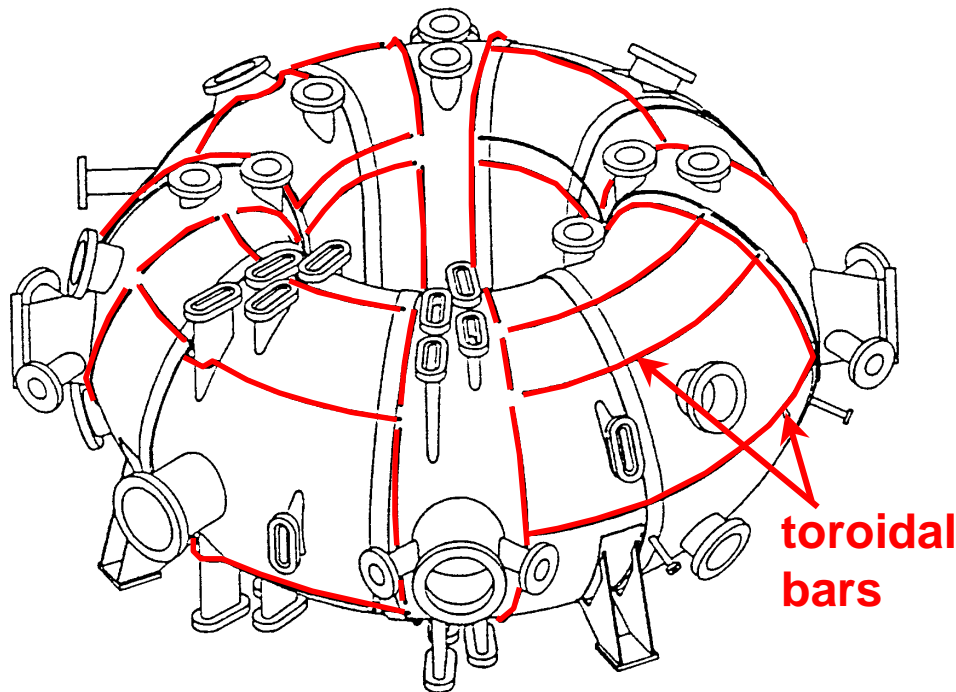
$m,n = 3,1$ 1.2 G/kA

$m,n = 2,1$ **0.2 G/kA**

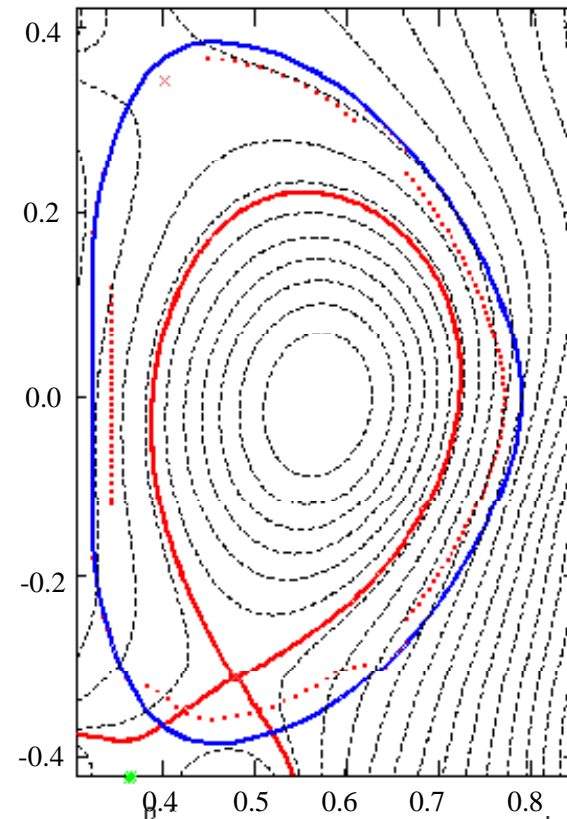
$m,n = 1,1$ 1.7 G/kA

COMPASS-D RMPs and plasma

- ~2000 configs possible in each quadrant:



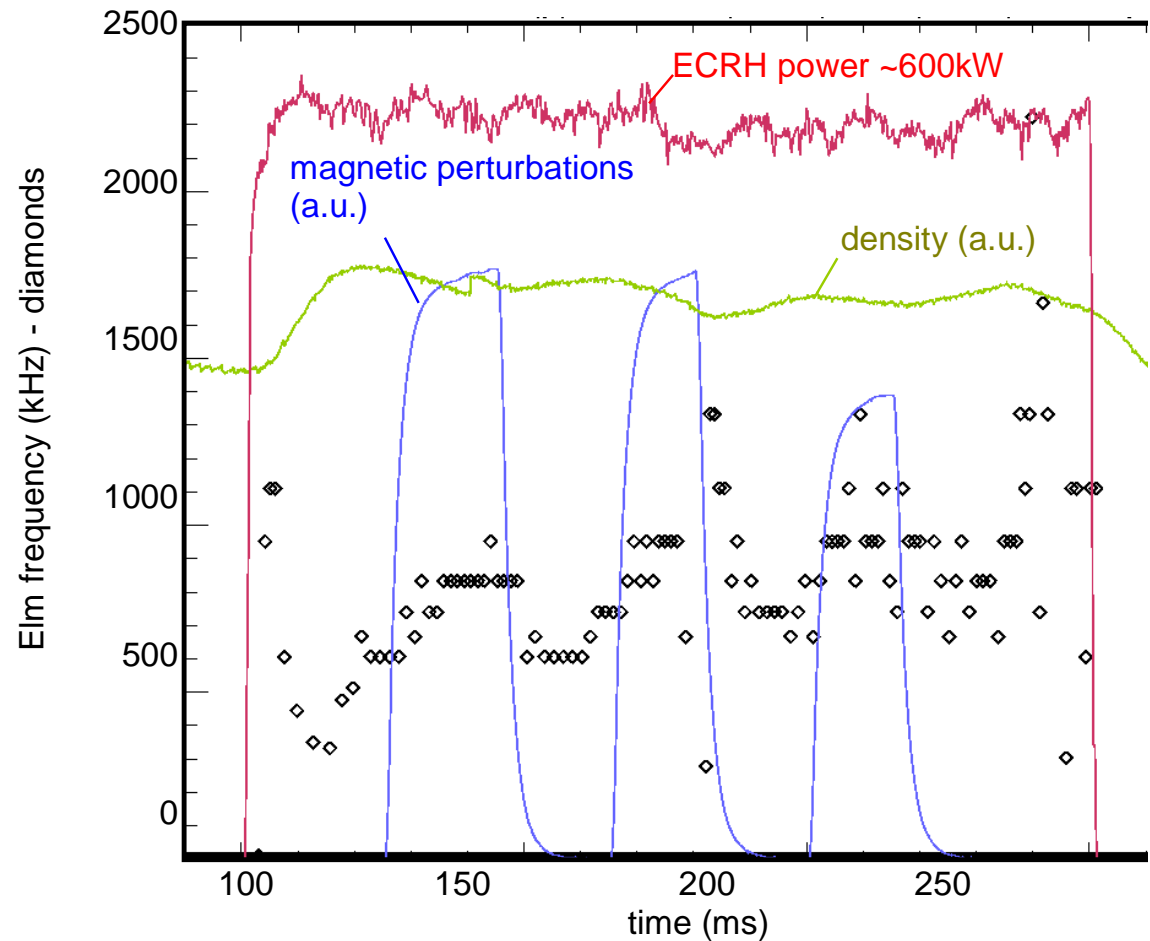
Height (m)



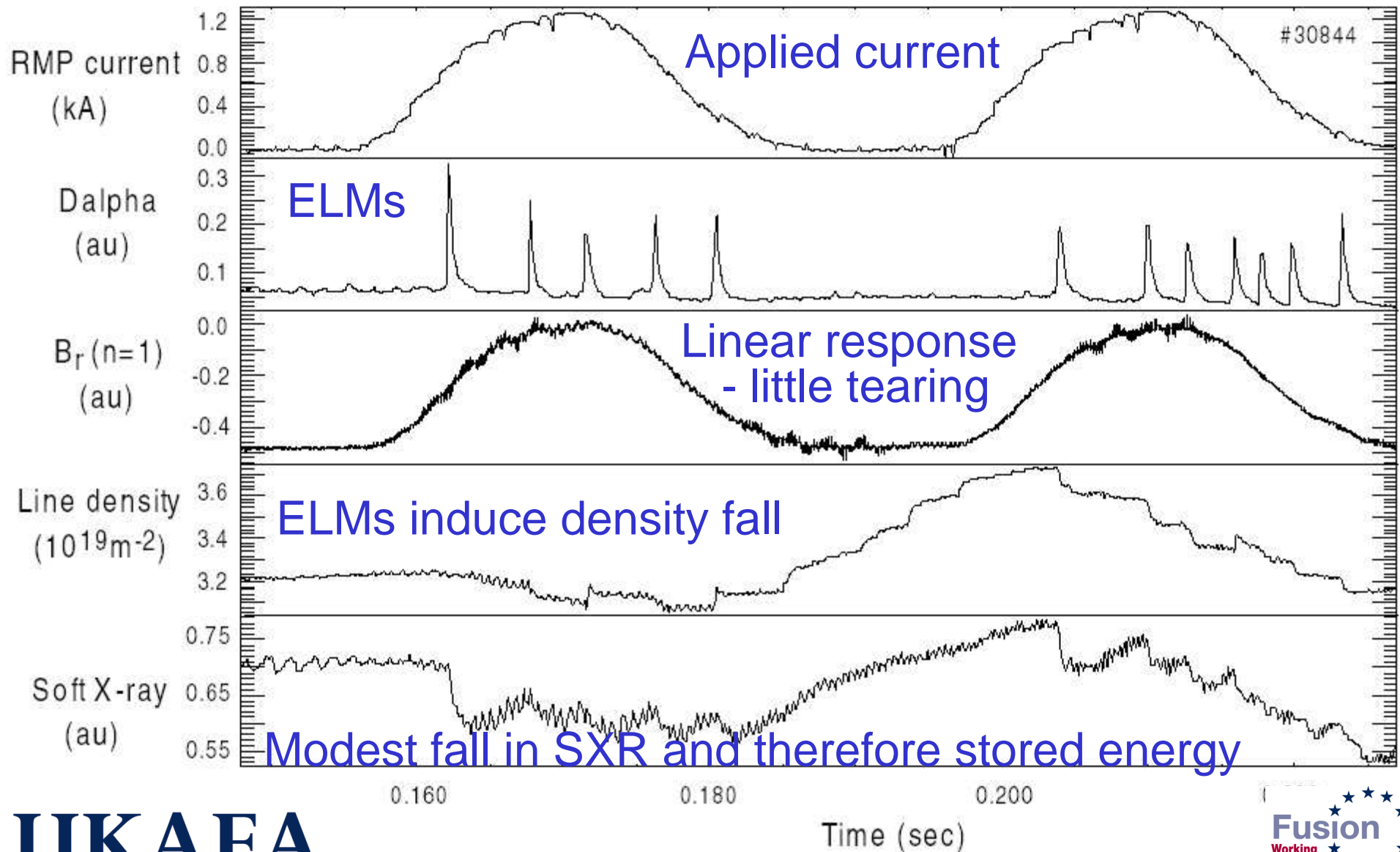
Radius (m)

Type III ELM control

- No 2/1 island formed
- 10% fall in stored energy with RMP
- Larger fields led to H-L
- Possible evidence for a threshold in required current



Influence in ELM-free H-mode



Conclusions

- Edge resonant $n=1$ perturbations affect ELMs
 - may be equivalent in effect on ELMs to a decrease in power through the separatrix
- Interaction could be:
 - ergodisation between $4/1$ and $5/1$ surfaces
 - *more modelling would be nice*
 - influencing transport and/or rotation, affecting barrier
 - direct interaction with ELM harmonics?
- Core harmonic resonances avoided by avoiding $2/1$ and $3/2$ fields
 - worth exploring to compare with $n=3$ fields on D3D?