MHD Task Group Planning Session

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MHD Stability ET Group Planning Session Summary

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Run Plan Guidance for CY 2003

- Constraints
  - Six experimental task groups
  - 21 run weeks is the present guidance
  - MHD ET slated to have 13 run days out of 21 run weeks
    - RF and CHI to be given more time
  - The 13 run days does not include our contingency allotment
- Similarity experiments with tokamaks are encouraged

Scheduled Presentations

- Presentations
  - SOL Current during ELMS / MHD destabilization (Takahashi)
  - Stability limits at increased elongation and reduced li (Menard)
  - Ohmic locked mode studies with short duration NBI (Menard)
  - Chirping beam-ion driven instabilities (Heidbrink)
  - Beta limit dependence on triangularity (Gates)
  - Resistive wall mode physics experiments (Sabbagh)
  - ELM physics in NSTX (Bush)
  - Fishbones, TAE, CAE, NTM (Fredrickson)
- MHD milestones discussion
- MHD XP priority discussion

MHD Group Research Goal Discussion

- MHD Research Goals
  - Attempt to reach conceptual design target beta parameters (through MHD or ISD group)
  - Dedicate run time to further broadening pressure profile (through MHD or ISD group)
  - Extensive study of RWM physics in ST, and performing similarity experiment in DIII-D (and perhaps MAST (not yet scheduled for MAST))
  - Error field resonance, error field amplification, RWM rotation damping physics will be addressed in MHD group
  - Test hypothesis of increased q(0), q_{min} in reaching and sustaining $\beta_N > \beta_{Nnowall}$
    - Need MSE for this
  - Continue study of *AE modes and their impact on ST plasmas and comparison to advanced tokamaks (i.e. DIII-D)
  - Conclude what physics causes terminating beta collapses in LSN long-pulse shots (several different physics causes - dependent on β).
  - ELM studies of triggers, stability calculations (needs of profile accuracy), transient effect of ELMs on profiles
  - NTM identification still pending - revisiting at lower error field is possible

MHD XP Prioritization

- MHD XP Presentations
  - SOL Current during ELMS (Takahashi) – 0 days (piggyback)
  - Stability limits at increased elongation and reduced li (Menard)
    - Plasma control capability might be an issue
    - Useful to scan stability space; keep qmin>2 at bt = 0.44T (1-2 days)
  - Resistive wall mode physics experiments (Sabbagh)
    - RWM stabilization physics at low A XP (1.5 days)
    - NSTX/DIII-D RWM similarity experiment XP (1.5 days)
    - RWM rotation damping physics XP (W. Zhu thesis work) (1 days)
  - Ohmic locked mode studies with short duration NBI (Menard)
    - Error field resonance / EFA near no-wall limit (1 - 1.5 days)
  - Beta limit dependence on triangularity (Gates)
    - Wants to complete database at Fp ~ 2.4 (1 day)
    - How does Fp vary with delta? Dave claims not.
  - CAE (Fredrickson) (1 day)
  - ELM physics in NSTX (Bush)
    - ELM physics: identification (i.e n number, type, triggers, bootstrap) (1.5 days)
    - Overlap with T&T XP?
  - Chirping beam-ion driven instabilities (Heidbrink)
    - Dedicated run time expected to be needed (1 run day)

14 week

  - Fishbones, TAE(Fredrickson)
    - High frequency ~ possibly 15 MHz modes (ICE, perhaps?) (1 day)
  - NTM (Fredrickson, Gates, M. Bell)
    - NTM: high beta*Tau shots could be good target plasmas (1 day)
  - Resistive wall mode physics experiments (Sabbagh)
    - (Resilience of low A plasmas to kink/ballooning modes XP: highly desire MSE)

(compress above run days)