MHD Task Group Planning Session

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NSTX Forum – 9/11/2002

MHD Stability ET Group Planning Session

Princeton Plasma Physics Laboratory

Group asked to develop both milestones and XPs

❏ Many future milestones are already completed

   ❏ Milestones as stated for FY03

      ● *Explore and characterize plasmas with high beta near the no-wall stability limit simultaneously with high energy confinement for durations greater than the energy confinement times.*

      ● *Assess interactions between plasma resonant field responses, correction field, and plasma rotation.*

   ❏ Milestones as stated for FY04

      ● *Avoid or suppress beta-limiting modes in high beta NSTX plasmas.*

      ● *Characterize energetic particle-magnetosonic wave interactions.*

❏ Proposed research in XPs continues to be advanced physics

   ❏ Management wants to hear the group's vision of research goals

   ❏ NSTX can provide advanced, high β ST plasmas for MHD studies

NSTX

CY02 plasma operation now in wall-stabilized space
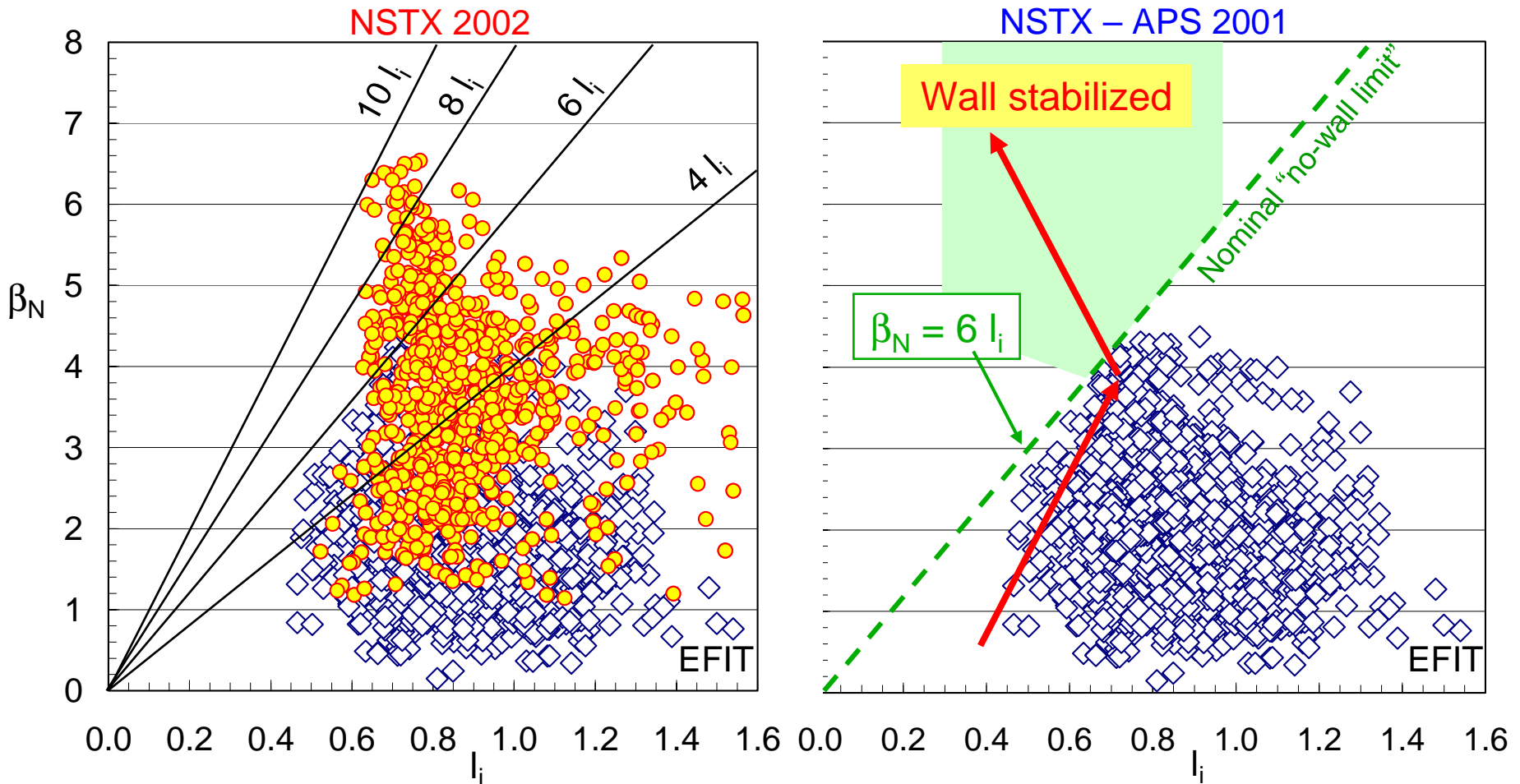
- Normalized beta, $\beta_N = 6.5$, with $\beta_N/l_i > 9.5$; $\beta_N > 30\%$ over $\beta_{N\,no\text{-}wall}$

- Toroidal beta has reached 34%

Physics Research Guidance for CY 2003

❑ Physics topics

  ❑ Beta-limiting modes, identification and physics

  ❑ Ideal kink/ballooning (full toroidal mode number spectrum)

  ❑ Resistive wall modes

  ❑ Classical / neoclassical tearing modes

  ❑ Fast-ion induced MHD and consequences (i.e. particle loss)

  ❑ Passive / active stabilization

  ❑ *AE mode structure at low aspect ratio

  ❑ Rotation shear stabilization

  ❑ Impact of static error field

NSTX

Run Plan Guidance for CY 2003

❏ Constraints

    ❏ Six experimental task groups

    ❏ 21 run weeks is the present guidance

    ❏ MHD ET slated to have <u>13 run days</u> 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)

❑ MHD milestones discussion

❑ MHD XP priority discussion