

WG-1 Plasma Formation and Sustainment by Slow Mechanisms

Subject: Electromagnetic mechanisms slower than plasma resonances and oscillations

A) Overall Tasks and Goals:

- 1. Generate a reliable and efficient plasma formation scenario for ST experiments.**
- 2. Develop current sustaining schemes based on non-inductive CHI or other MHD relaxation mechanisms.**
- 3. Utilize NSTX facility to develop new formation schemes of compact toroid and/or RFP configurations.**

B) Immediate Tasks

- 1. Establish a reliable plasma formation scenario for Day-1 operation of NSTX.**
 - A) Optimized Inductive Formation**
 - B) Aided by ECH, electrode discharges and NBI.**
- 2. Prepare for helicity injection (formation and sustainment) based on electrode discharges.**
- 3. Make inputs into NSTX machine design so that NSTX can be best utilized for concept innovation.**

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Near Term Activities for WG-1

1. Establish a reliable plasma formation scenario for Day-1 operation of NSTX.

A) Optimized Inductive Formation

Utilize tokamak experience: K. Wong, et al

B) Aided by ECH, electrode discharges and NBI.

2. Develop current sustaining schemes based on non-inductive CHI or other MHD relaxation mechanisms.

A) Utilize experience from electrode-based helicity injection:

T. Jaboe, P Bellan et al

B) Utilize other helicity injection schemes

J. Sarf, M. Schafer et al

3. Make inputs into NSTX machine design so that NSTX can be best utilized for concept innovation.

A) Compact Toroid Formation (Spheromak/FRC)

B) Low Aspect Ratio RFP possibilities

C) Outboard stellarator winding proposed (P. Moroz)