
HHFW/EBW Experimental Task Group

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Baseline FY04 Milestones Relevant to the HHFW/EBW Experimental Task Group

Milestone FY04-3 on Wave-Particle Interactions:

Measure plasma current profile modifications produced by HHFW with MSE.

Milestone FY04-5 on Wave-Particle Interactions :

Measure EBW emission to assess coupling requirements for heating and current drive

-> Assume 12 dedicated XP run days for ET during the campaign



Power Accountability Remains a Major Challenge for HHFW

- *Investigate thermal ion heating; use new X-ray crystal & CHERS T_i , edge CHERS T_i & rotation, B-dot probe*
- *Vary inner & outer gaps in double null discharge; previously only studied in limiter and lower single null*
- *Study effect of varying density on heating efficiency over a wider range of density*
- *HHFW power scan into fixed target plasma*
- *Study three wave edge parametric decay*
- *Power deposition studies with RF modulation [with T&T ET]*



Measuring $J(R)$ during HHFW CD, RF-Only H-Modes & Integration of HHFW with NBI will be Major Focus in 2004

HHFW Current Drive Studies:

- *Measure $J(R)$ with motional stark effect (MSE) diagnostic*
- *Dependence of CD efficiency on RF power, density, temperature and antenna phasing*

HHFW H-mode access without NBI [with T&T ET]

Heating & Coupling with NBI:

- *Modify internal inductance with early heating; reduce volt-sec consumption & increase $q(0)$ [with ISD ET]*
- *HHFW heating efficiency with strong NBI; study dependence on target β and density*



Demonstrate Efficient EBW coupling & HHFW Coupling into CHI Plasma

EBW Research:

- *Obtain $\geq 80\%$ B-X and/or B-X-O conversion on NSTX*

Solenoid-Free Plasma Startup:

- *Couple to CHI startup plasma [with CHI ET]*
- *HHFW heating with CHI to develop bootstrap current [with CHI ET]*
- *HHFW CD phasing with CHI for direct CD [with CHI ET]*

HHFW Technical Performance Improvements:

- *Feedback HHFW power on antenna voltage*
- *Dynamically control antenna-plasma gap*



HHFW/EBW ET Meeting Schedule

Monday, November 10, 1:00 - 5:30pm, Director's Conference Room

1:00 Introductory Remarks - Taylor

HHFW:

1:10 HHFW Power Deposition & Transport Studies - Swain

1:25 Investigation of Parametric Decay During HHFW - Wilson

1:40 Parametric Decay & Edge IBW Absorption - Pinsker

1:55 HHFW Loading & Ponderomotive Effects - Bernabei

2:10 HHFW Power, Density & Phase Scans - Bernabei

2:25 HHFW Current Drive & MSE Status - Ryan/Levinton

2:40 HHFW CD Degradation with Thermal & Fast Ions - Kessel

2:50 - *Break* -

3:00 HHFW H-Mode Plasmas & HHFW in High Beta - LeBlanc

3:15 Modeling HHFW Fast Ion Interaction - Harvey

3:30 HHFW Modeling - Mau

3:45 Analysis Code Upgrades for HHFW & EBW - Rasmussen

EBW:

4:00 EBW Emission Experiments - Taylor

4:15 Possible EBW Experiments - Rasmussen

4:30 Planning Discussion:

- Identify Specific XP's & Lead Authors
- Formulate Research Plan & Prioritize XP's

