HHFW Current Drive Proposals

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Current drive experiments

- High-power CD [≥ 5 MW, if fix to feedthroughs works]
- Re-visit trying for long-pulse (~ 1 s) CD experiments - need to have pulse long enough so that conditions are ~constant (we tried, but didn't get there last year)
- Driven current profile measurements [when/if MSE is operational]

Long Pulse CD Experiments

Need to increase pulse length in order to reach steady-state conditions.

- Baseline Milestone #3: *Measure and analyze the effectiveness of using a combination of noninductive techniques to assist in startup and sustainment of plasma pulse lengths up to 1 s.*
- Transients complicate CD analysis.

In order to increase pulse length, we need to

- Improve antenna reliability
  - Higher power will conserve volt-seconds
- Improve plasma position control
  - Need to maintain match throughout the pulse
- Avoid MHD collapses
  - Different current ramp rates, rf turn-on times
  - Explore higher density operation
  - Higher beta (higher Te) operation to see if we can drive some off-axis current.

Heating vs. HHFW phase velocity experiments

During CD experiments last year, we concentrated on low-density and relatively low-beta operation, trying to get CD efficiency up. This would be a set of experiments at higher density (≥5e19) to achieve high-beta operation, and to study the effect changing the wave phase velocity and launch direction has on heating efficiency and possibly power deposition profile.