

Reliability and Performance Ideas



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XMP to measure rf noise generation



It appeared that for fast phase velocity shots last time (e.g., inter-loop phasing of 30 - 60°) the rf noisepickup on the magnetic diagnostics increased. We need to see how bad this is; if it is a real problem, we need to figure out how to reduce it.

This needs to be done early in the run period if possible.

Pressure rise experiments



We observe the pressure behind the antenna rises during rf. Assuming we get a direct pressure meas. in an antenna box, do experiments with plasma and rf to map out the dependence of the pressure on rf power, gas density, etc.

Breakdown studies



These might be an XMP, an XP, or a combination. We still don't understand why the antenna voltage limit is lower in plasma than during conditioning. Here are some possible things we could do:

- a) Run antennas in vacuum, $B=0$; measure max voltage before breakdown.
- b) Increase neutral gas pressure, plot $V_{\text{breakdown}}$ vs pressure. Probably use D for fill gas; maybe He later on.
- c) Add magnetic field (0.3T), repeat a) and b)
- d) Possibly repeat c) for other values of field
- e) Now add plasma from ECH breakdown only to c)
- f) Finally do complete plasma shot(s)

Antenna conditioning study



Study effects of different antenna conditioning regimes on HHFW operating capabilities.

We need to determine if:

- long pulse (> 1 s) vacuum conditioning is preferred,
- conditioning pulses between shots is needed,
- high temperature operation of the antennas would be beneficial (this would be inferred from outgassing measurements and pressure/breakdown studies).