HHFW Conditioning XMP

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and anyone else who can stoke the furnace

XMP Objectives

- Condition HHFW for high power operation
  - Withstand >25 kV at cubes in vacuum
  - Withstand ~15 kV at cubes in plasma for 200 ms pulses, phase shifts of 30º-180º.
- Check out RF signals and diagnostics
- Obtain loading vs power (estimate sheath losses)
- Check out operation for upcoming XP scenarios
  - High plasma current operation
  - H-mode loading
  - NBI-driven plasmas
  - Duplicate conditions of 2004 (i.e., shots 107899, 107907)

Day 1 - Plain vanilla plasma, condition to highest power, scan phases to clean those hard to reach areas.

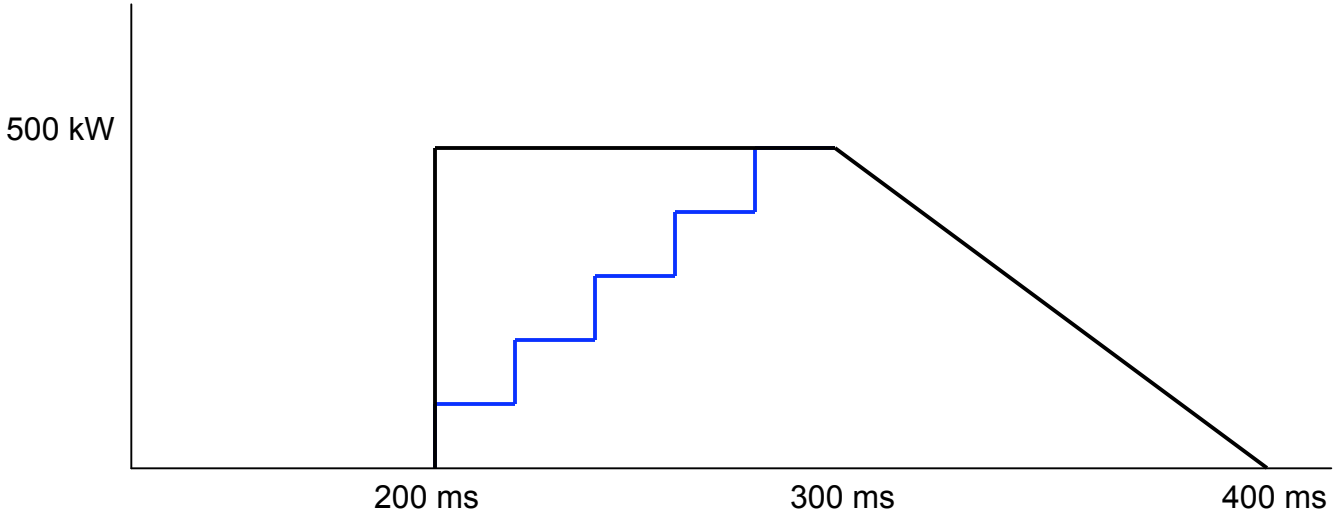
- Day 0 - vacuum condition to 25 kV as per last year
- Day 1
  - Start with He operation, condition until 2 MW can be held for 180º and -90º.
  - Switch to D and repeat; see if there is any voltage degradation, local pressure rises during RF.
  - Condition +90º for same cube voltage limit.
  - Back to 180º, -90º and continue to increase power
  - Last hour of day: slow ramp to 600 kW at 180º, -90º, -30º, +30º, and +90º to check sheath loading.

Day 2 - Continue conditioning, develop operating techniques

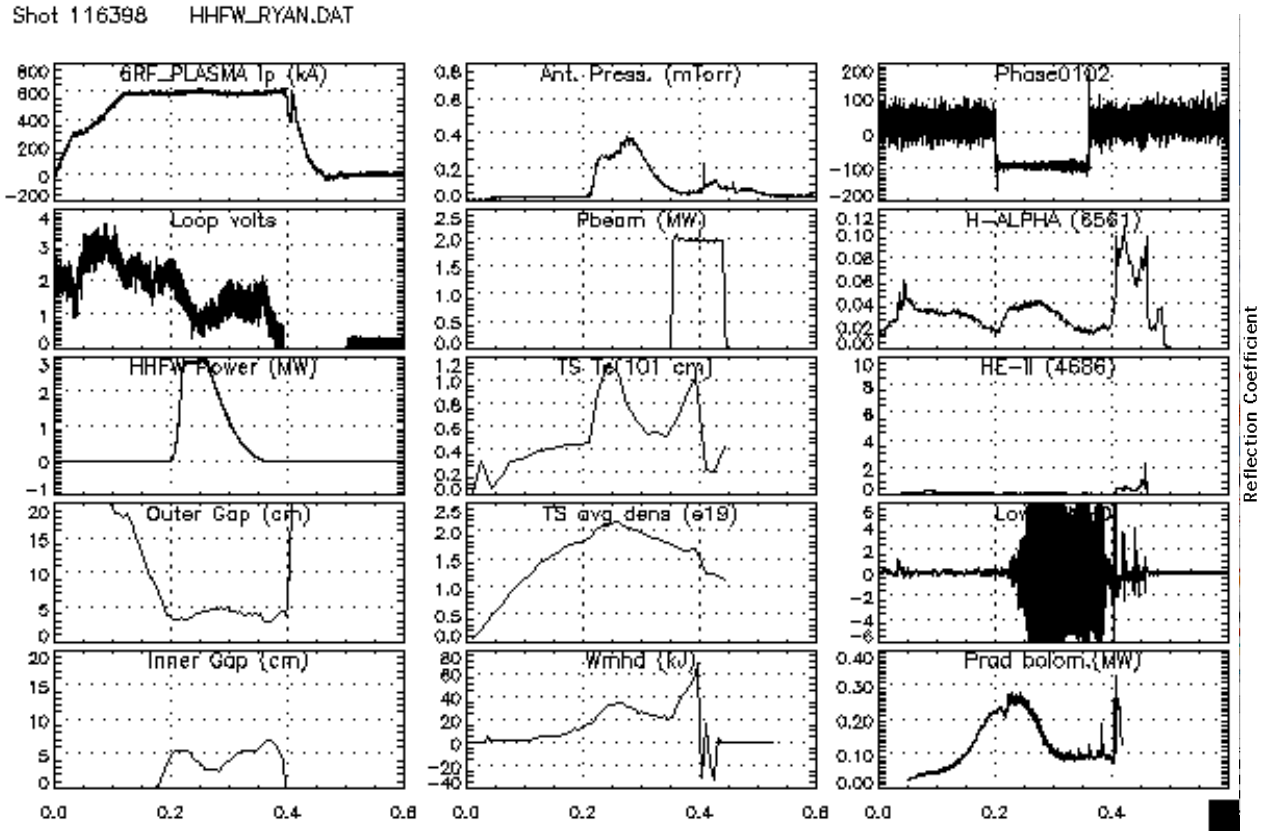
- Part 1 - more conditioning
  - Continue conditioning to 4 MW level (15 kV or greater on cubes) or until a hard voltage limit is reached.
- Part 2 - check operation in future plasmas
  - High Ip (~900 kA)
  - NBI operation (high Ip and large gap)
  - NBI-driven H-mode plasma (steep density profiles)

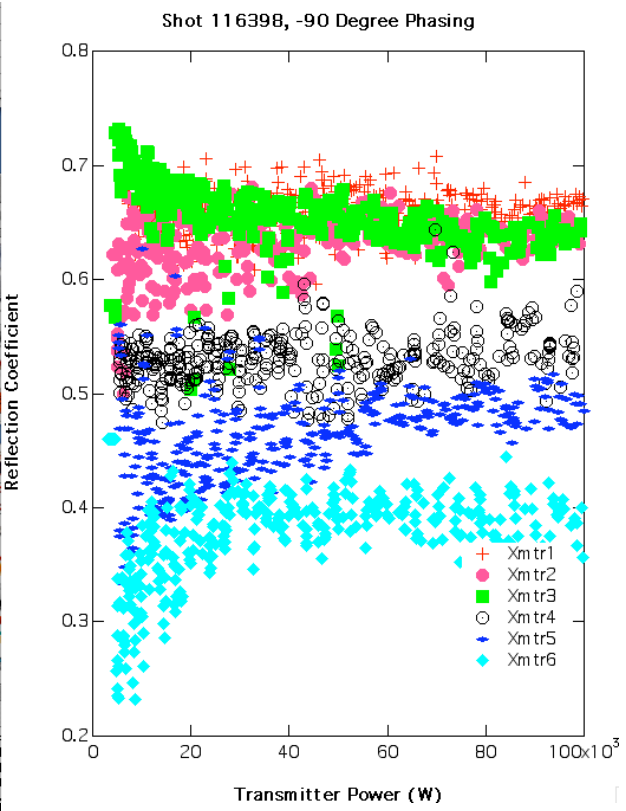
During conditioning, measure loading as a function of power to determine rf sheath losses.

- Sheath power proportional to V, HHFW power proportional to V^2.
- Larger fraction of total power to sheath at low strap voltages.
- At minimum, put a slow ramp down on low power conditioning pulse.



June 16 2005 - Rload vs P during conditioning
Ip = 600 kA, B0 = 0.45 T, He





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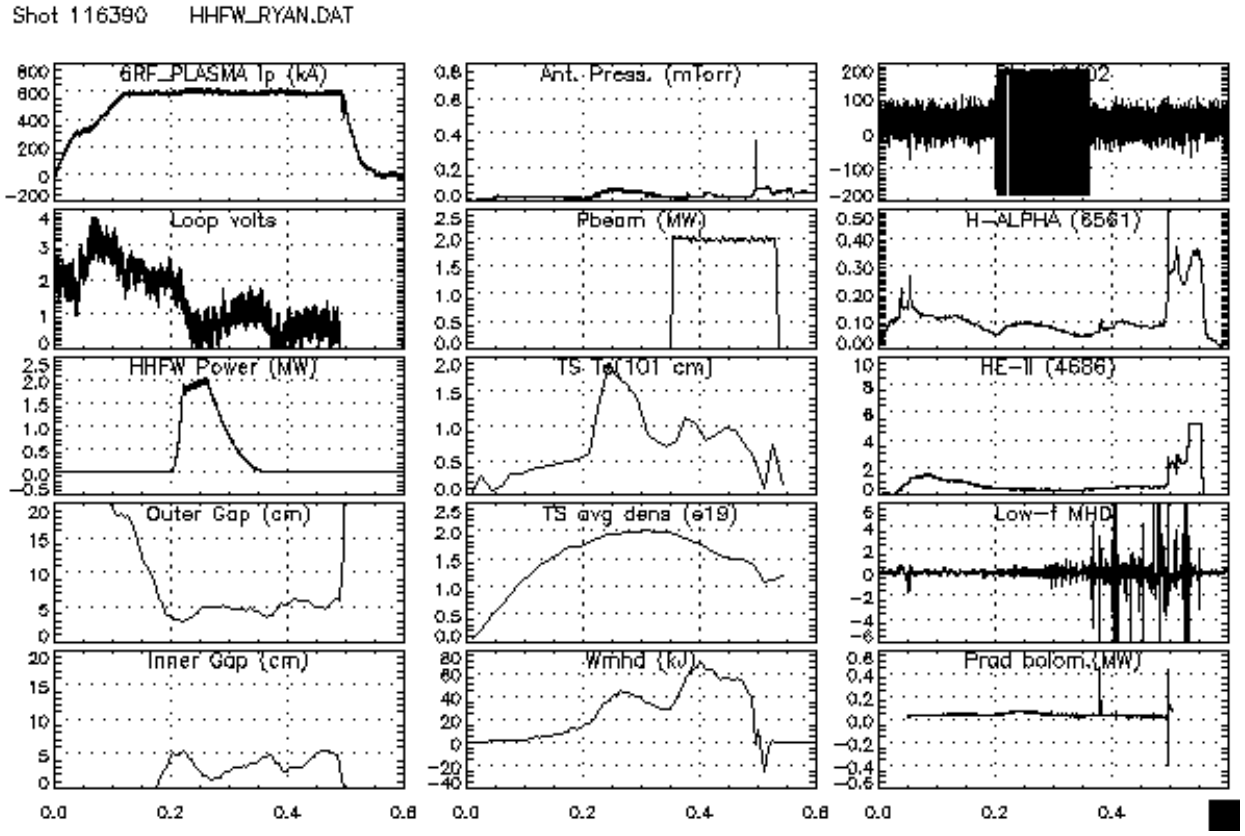

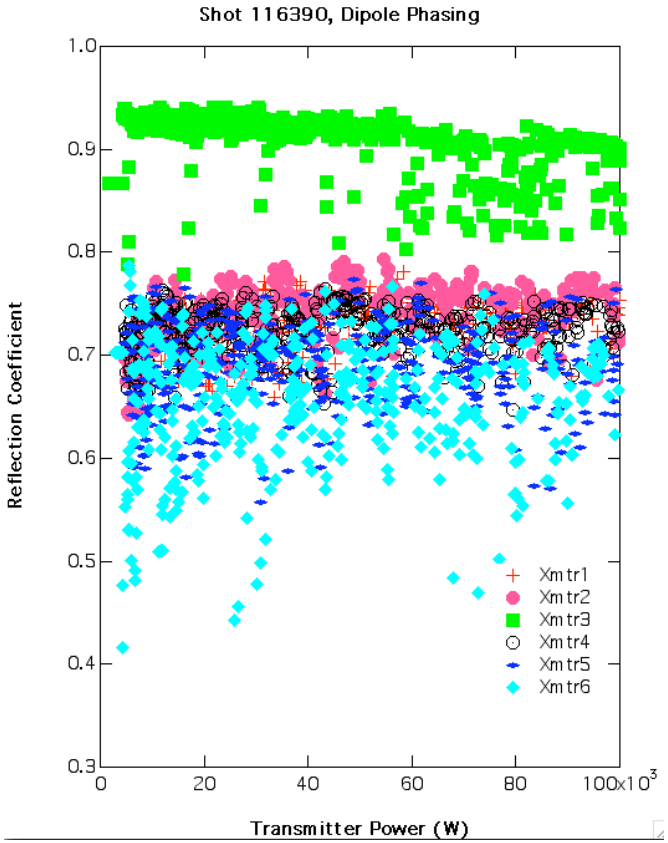

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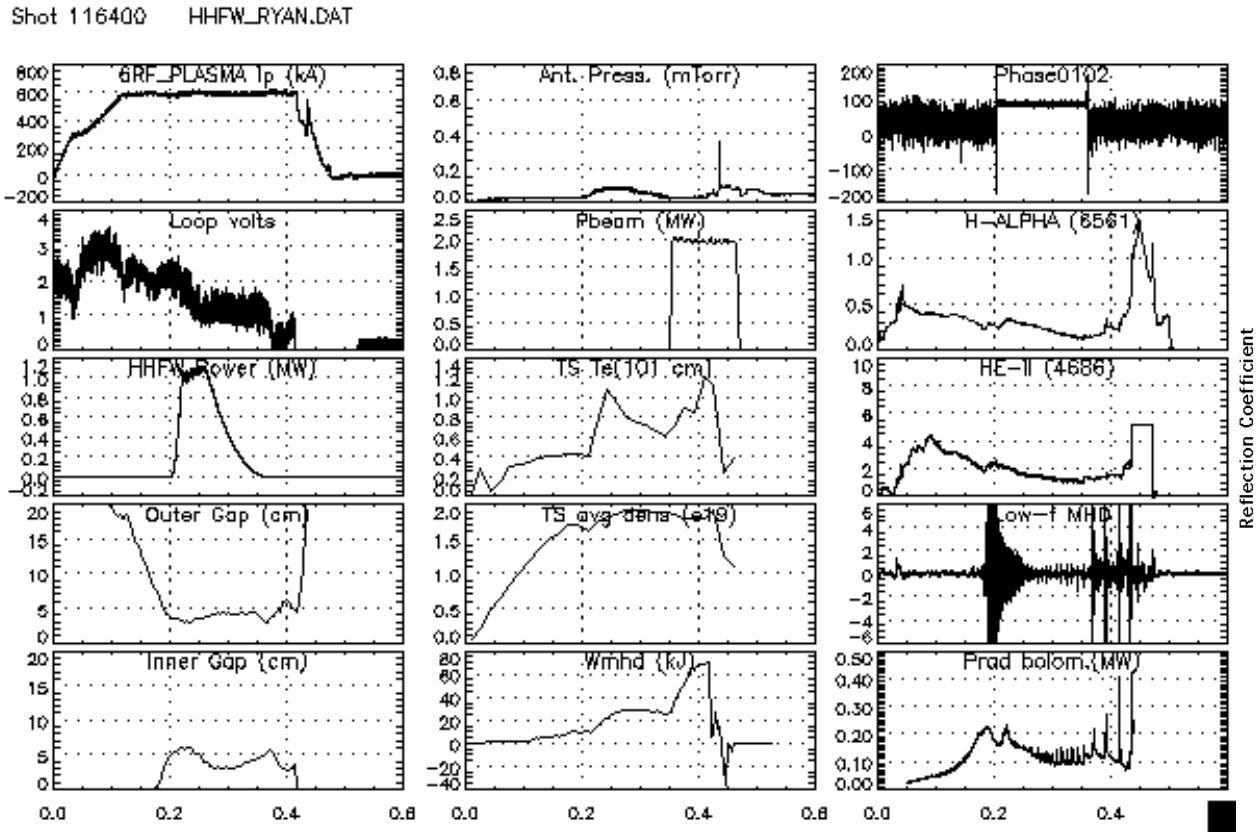

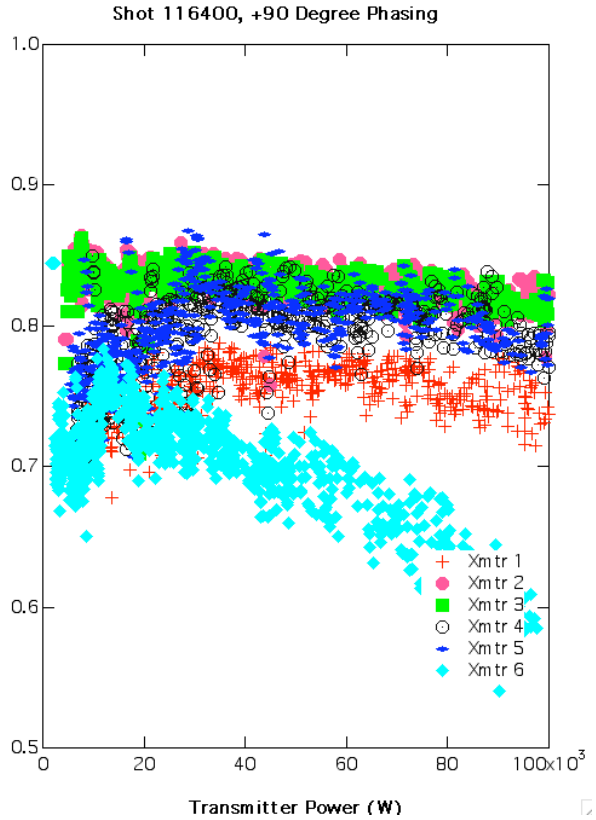

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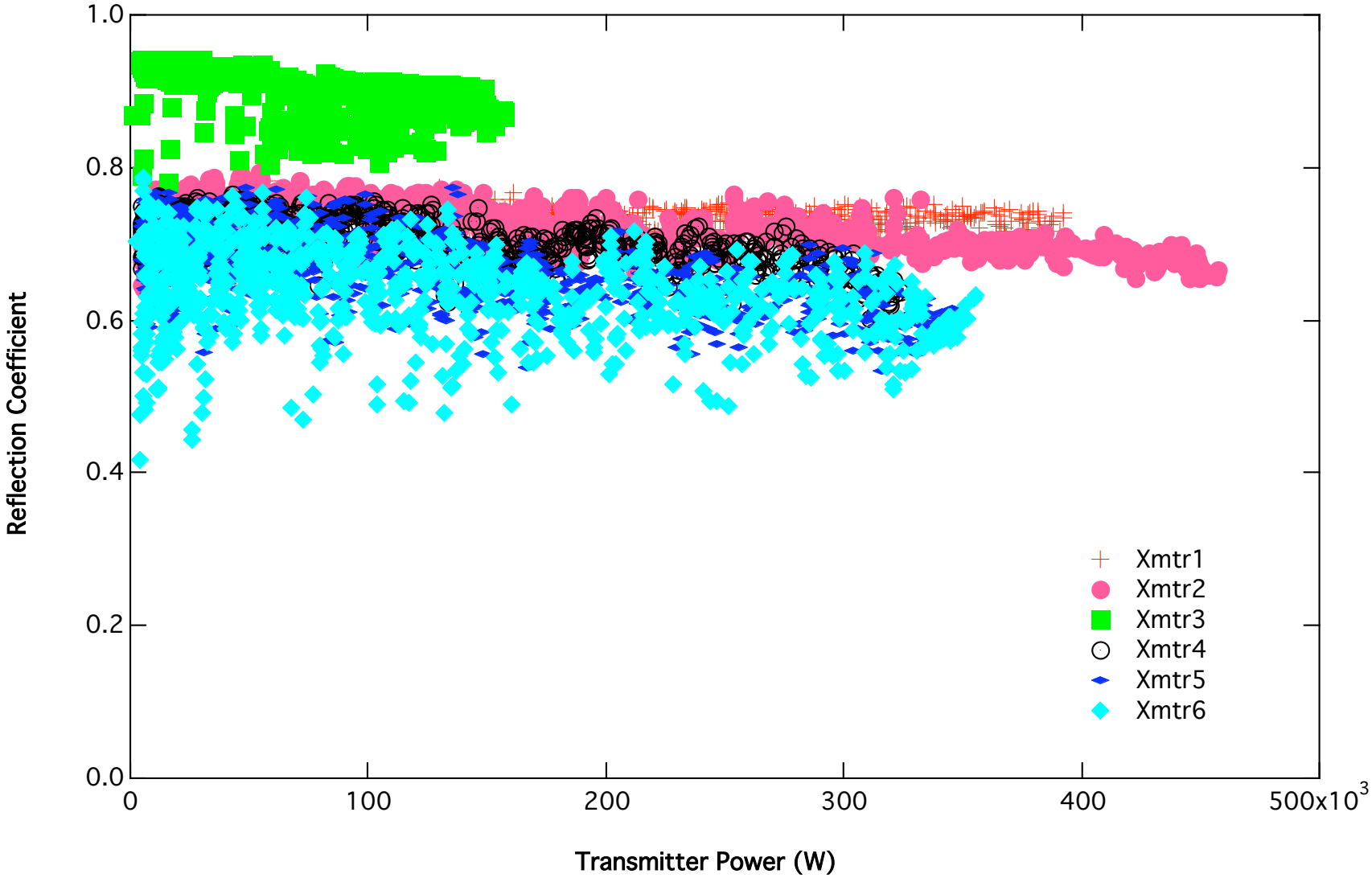
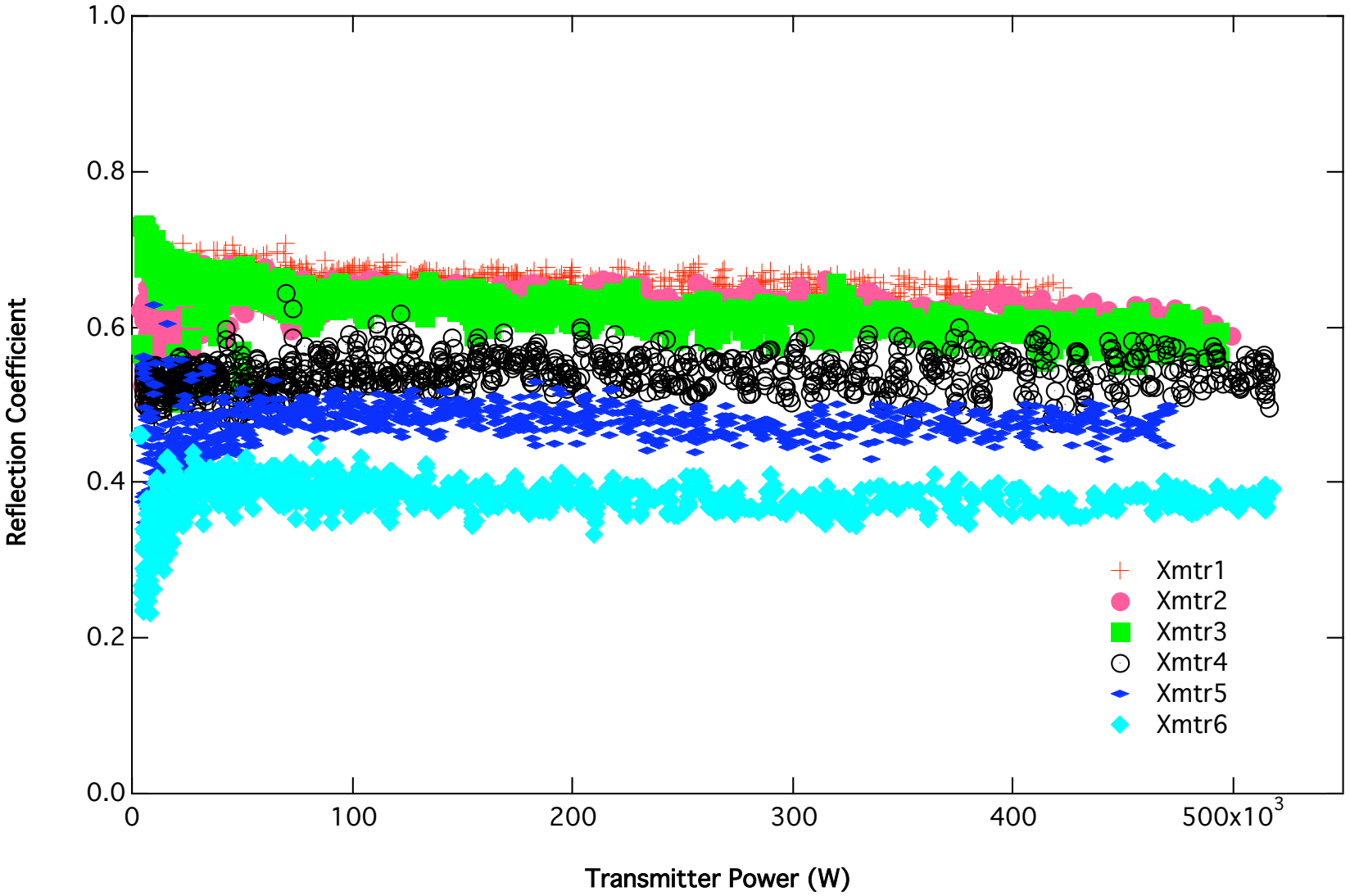
Shot 116390, Dipole Phasing



June 16 2005 - Rload vs P during conditioning
Ip = 600 kA, B0 = 0.45 T, He
Shot 116398, -90 Degree Phasing



June 16 2005 - Rload vs P during conditioning
Ip = 600 kA, B0 = 0.45 T, He

Shot 116400, +90 Degree Phasing