

Future Plans for T2

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Future Plans for T2

I. Continue to study data from “old” T2.

- new ideas→look at old data base
- comparison studies between T2 and T2R.

Some knobs will be turned in going from T2 ® T2R that are normally not possible to turn.

II. What are the major changes?

1. TF coil now standard.
 - no “quasi” shell effect
 - reduced ripple (no helical ripple)
 - segmented → $m=0, n=1$ rotation.
2. First wall changed from graphite to stainless steel with Moly armor.
 - expect high I/N (need gaspuffing)
 - uncertainties in measuring Z_{eff}
 - cautious operation required!
 - *edge physics dependence on wall material – graphite versus ss/Moly.*

Hierarchy of Time Scales in T2

Characteristic Time	Comment	Values in T2 (ms)
Zero		
$t_{rot} \sim \frac{1}{\omega_{rot}}$	“natural rotation” $\sim \frac{a^2 B}{T_e}$	0.05
t_{liner}	resistive vacuum vessel	0.03
t_{TM}	linear non-linear dynamo events relaxation cycle	0.05-0.2
$t_{start-up}$	time to reversal	0.2-0.5
t_{shell}	“old” T2	1.5
t_{I-ramp}	time to flat-top	2 ms
t_{shell}	T2R	5 ms
t_{pulse}	potential?	20 ms → ?

3. New shell.

- Shell design. Double with off-set poloidal and toroidal gaps and no outer conducting shell.
- *Magnetic penetration time 1,5 ms @ 5 ms.*
- *There should be access to an operation regime with natural rotation.*
 - Study the torque balance:
 - mode-mode
 - mode-plasma
 - mode-liner current (Fitzpatrick)
 - mode-external field
- Resistive shell modes.
 - “Stabilisation” of RS mode growth of the internally resonant modes by rotation.
 - Better diagnostics → look for the external kink.

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III. Confinement.

1. Add some data points to the international RFP data base.

2. Probably will not emphasize scaling studies since we will be cautious with high current operation.
3. QSH in a high aspect ratio RFP?
(It was seen in T1)
4. Add diagnostics. (T2R has more ports)
 - ion temperature (TOF)
 - plasma rotation (high resolution Spec.)
 - spatial resolution
 - off-axis TS and interf.
 - off-axis spectroscopy
 - edge probes

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