1. Purpose of Experiments
   Include immediate goal of the experiments, scientific importance and/or programatic relevance.
   Refer to any relevant program milestones.

   The purpose of this experiment is to investigate the link between RF deposition location and the shape of the toroidal rotation profile. This experiment could possibly show a concrete link between, RF power deposition, RF power deposition location, and toroidal rotation.

2. Background
   Discuss Physics basis of the proposed research, Prior results at Alcator or elsewhere, and any related work being carried out separately

   Previously, experiments have been performed to measure the toroidal rotation during a field scan, equivalent to a deposition location scan [1]. These experiments were done using a single HIREX though. There have been some theoretical propositions, that indicate there may be a link between RF power deposition and Toroidal rotation [2]. Experiments have also been performed to measure the toroidal rotation profile, during a TF ramp [3]. If we can show a link between toroidal rotation and ICRF power deposition, we can draw some conclusions about the role RF plays in the suppression of turbulence and the formation of ITBs.

3. Approach
   Describe the methodology to be employed; explain the rationale for the choice of parameters, etc. Describe the analysis techniques to be employed in interpreting the data, if applicable. If the approach is standard or otherwise self-evident, this section may be absorbed into the Experimental Plan

   This investigation would be carried out by varying the TF over a series of shots, keeping it constant during any given shot. The shot to shot variation, perhaps 0.2 Tesla, corresponds to about a 2.5 cm shift in resonance location. We would like to vary the field from about 4 Tesla to about 6 Tesla. This will give us information about both high field power deposition, and low field power deposition, and allow us to compare any differences.
4. Resources

4.1 Machine and Plasma Parameters

Give values or range for:

**Toroidal Field**: 4.0 – 6.1 T

**Plasma Current**: 1.0 MA

**Working gas species**: D(H)

**Density**: EDA Target

**Equilibrium configuration** (if possible, refer to database equilibria): like 1020925004

**Pulse length, typical current & density waveforms, etc.** Refer to database or sketch desired waveforms.

4.2 Auxiliary Systems

**RF Power, pulse length, phasing**: Maximum power available, at least 2 MW.

**Pellet Injection (species)**:

**Impurity blow-off injection**:

**Diagnostic Neutral Beam**:

**Special gas puffing**:

**Other**:

4.3 Diagnostics

List required diagnostics, and any special setup or configuration, e.g. non-standard digitization rate.

Thomson Scattering, EDGE TS, ECE, Visible Bremsstrahlung, ALL HIRECIES, DNB (Specifically CXRS), PCI, heatpulse propagation analysis.

5. Experimental Plan

Both sections must be filled in.

5.1 Run sequence plan

Specify total number of runs required, and any special requirements, such as consecutive days, no Monday runs, extended run period (10 hours maximum), etc.

One run day 20 Good shots. Quality of shots is crucial.

5.2 Shot sequence plan

For each run day, give detailed specification for proposed shot sequence: number of shots at each condition, specific parameters and auxiliary systems requirements, etc. Include contingency plans, if appropriate.

Shots: 1 – 4 Get good consistent repeatable plasma. 5.4 Tesla Shots: 5 – 13 Scan TF down from 5.3 in 0.2 tesla steps, (5.3, 5.1, 4.9, ..., 3.7 T) Shots: 14 – 20 Scan TF up from 5.5 in 0.2 tesla steps, (5.5, 5.7, 5.9, ..., 6.7)
6. Anticipated Results

Discuss possible experimental outcomes and implications. Indicate if the program may be expected to lead to publications, milestone completions, improved operating techniques, etc. Indicate if the experiments are intended to contribute to a joint research effort, or an external database.

These experiments will hopefully have at least three significant results. First, it will provide valuable information about the link between ICRF power deposition, and toroidal rotation. These data, will likely indicate there not only is there a link, but that the RF can be used to deliberately shape the rotation profile. Second, these experiments will provide experimental evidence that could support many existing RF-rotation theories. Finally, these experiments will produce data relevant to Davis’ thesis.

7. References

Include references both to external and internal literature or communications which bear on this proposal. See Section 2.


