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

   Study ITB’s at 5.4 T in detail. Obtain high resolution Te information on barrier size, shape, Te gradients, and thermal transport behavior.

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

   ITB’s at 5.4 T with 70 MHz RF have been generated before at C-MOD, but have not been studied in detail (only 3 previous discharges exist). We will study the Te profile, gradients, and transport (using Te perturbations) within the ITB.

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.

   We will generate ITB’s at 5.4 T to optimize the heterodyne ECE minor radius coverage and spatial resolution. We will use small toroidal field ramps to sweep a single heterodyne channel over the ITB to determine the Te gradient within the barrier. We will use sawteeth and possibly impurity injection to perturb the electron temperature and study the resulting thermal transport through the ITB.

4. Resources
4.1 Machine and Plasma Parameters

Give values or range for:

- **Toroidal Field**: 5.4 T, with small (0.05-.15 T) ramps
- **Plasma Current**: 0.8-1.2 MA
- **Working gas species**: D2
- **Density**: any

**Equilibrium configuration** (if possible, refer to database equilibria): 1010801025

**Pulse length, typical current & density waveforms, etc.** Refer to database or sketch desired waveforms: 1010801025, with Bt ramps of approx. 0.05 T over 20-50 ms

4.2 Auxiliary Systems

- **RF Power, pulse length, phasing**: see shot 1010801025
- **Pellet Injection (species)**:
- **Impurity blow-off injection**: if available
- **Diagnostic Neutral Beam**: if available
- **Special gas puffing**: Other:

4.3 Diagnostics

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

Heterodyne ECE, GPC, Ti if available

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.

4 shots

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.

1 shot to reproduce reference shot 1010801025 and look at sawteeth propagation through ITB

2 shots with small (1-3%) Bt ramp to scan radiometer channels through ITB

1 shot with impurity injection to perturb barrier; if impurity injection is not available, do further Bt ramping to find optimum ramping speed and size
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.

The results from this will provide information on ITB size, shape, and Te transport properties that will help better understand ITB behavior.

7. **References**

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