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

   Measure temperature profile with new ECE system installed on port F. The system includes channels closely spaced for correlation calculations after the shot. This run will allow for the initial core measurements to look for temperature fluctuations in the temperature gradient region.

   This run will take place after ECE commissioning miniproposal is run.

2. Background

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

   Calculations of the electrostatic fluctuation-induced heat transport fluxes require local fluctuation measurements of the electron temperature. Previous measurements of electron temperature fluctuations in the plasma temperature gradient region have been made on TEXT-U and other toroidal devices. Applying electron cyclotron emission (ECE) correlation techniques to the new high resolution heterodyne ECE system on Alcator C-Mod will allow extraction of time-averaged temperature fluctuation amplitudes. Up to 20 correlation channels (10 correlation pairs) can be utilized per shot. This run will be comparable to previous measurements on other machines and set the base measurements for future perturbation and transition experiments (RF, L to H mode transitions, sawtoothing discharges, etc).

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.

   The parameters for choosing the initial profile measurements are standard for most ECE correlation experiments: a slightly varying toroidal magnetic field to move the channel
pairs around in the plasma, low plasma currents to lessen sawtoothing effects on correlation processing, and long flattops and little perturbations to allow for less shots needed in multishot averaging. Low to medium density would be nice as this will allow us to include the first harmonic edge system in the measurements.

These requirements are very close to fiducial shots and can be overlapped with startup fiducials.

4. Resources

4.1 Machine and Plasma Parameters

Give values or range for:

**Toroidal Field:** 5.3 - 5.7 Tesla

**Plasma Current:** 600 - 800 kA

**Working gas species:** Deuterium

**Density:** low ne-bar less than 1.3e20 /m³

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

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

4.2 Auxiliary Systems

**RF Power, pulse length, phasing:** none initially; could be some later on in run and/or late in discharge if run is going uncharacteristically well.

**Pellet Injection (species):** ditto above

**Impurity blow-off injection:** ditto above

**Special gas puffing:** ditto above

**Other:**

4.3 Diagnostics

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

4.4 Neutron Budget

Estimate the neutron dose rate at the site boundary. Give basis for estimate. (Once some experience has been gained a standard formula will be provided for estimating dose rates.)

I assume this will be low.
5. Experimental Plan

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.

I anticipate less than one day of run time with 5 shots taken at each toroidal field
strength. Not including setup shots, I estimate 15 shots. If perturbation experiments are
included late in the discharge, this will double the amount of shots required.

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 contin-
gency plans, if appropriate.

Minimum: 5 shots at 5.4 T (or 5.3 T) 5 shots at 5.6 T (or 5.5 T) 5 shots at 5.7 T

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.

With properly placed filter pairs, this experiment will map out the L-mode tempera-
ture fluctuation amplitude profile for the “standard” C-Mod shot sequence. This can be
compared to future perturbation experiments.

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


Oouroua, J. W. Heard, T. P. Crowley, P. M. Schoch, D. L. Brower, Y. Jiang, B. Deng, C.