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 determine if there is an ICRF power threshold for ITB formation with off-axis ICRF, or if the ITB can only be formed with the resonance on the high field side.

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

In two previous runs, 980206 and 1000601, the toroidal magnetic field was scanned above 5.3 T in order to move the ICRF resonance (80 MHz) to the low field side. Unlike the $B_T$ scan below 5.3 T, there was no ITB formation with the resonance at $r/a = +0.5$. The questions arise whether the formation of the ITB requires simply off-axis heating near the ITB foot location, if there is a $B_T$ or ICRF power threshold or whether counter-current flow drive, predicted to occur (Perkins) only with the resonance on the high field side, is necessary.

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.

4. Resources
4.1 Machine and Plasma Parameters

Give values or range for:

Toroidal Field: 4.5-6.000000 T

Plasma Current: 1.0 MA

Working gas species: D$_2$ with (5% H)

Density: $n_{e0} = 2 \times 10^{20} / m^3$ (target)

Equilibrium configuration (if possible, refer to database equilibria): 1001220016?

Pulse length, typical current & density waveforms, etc. Refer to database or sketch desired waveforms:
1001220016?

4.2 Auxiliary Systems

RF Power, pulse length, phasing: D+E 2-3 MW, maximum pulse length (800 ms), J 2-3 MW, at 80 MHz, for a total of 4-6 MW at 80 MHz

Pellet Injection (species):

Impurity blow-off injection: CaF$_2$

Diagnostic Neutral Beam: if available

Special gas puffing: argon

Other:

4.3 Diagnostics

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

HIREX, HIREX Jr, neutrons, core and edge Thomson, ECE, visible bremsstrahlung, TCI, bolos, x-ray arrays, heterodyne ECE

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.

1 run

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.

Scan the TF from 5.3 to 4.5 T in 0.2 T steps, to verify ITB formation (5 shots), then scan up 5.4, 5.6, 5.8, 5.9 and 6.0000 T, 3 shots each (15 shots) to allow for tuning.

Require reliable ICRF performance and low H content with freshly boronized walls. Some selected shots will have impurity injection by LBO.
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.

Optimization of double barrier plasmas for AT operation is a 2001 milestone. Will probably be included in a PRL and/or other publications, and APS invited talk(s).

7. References

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