Subject: Checking vertical alignment of ECE

From: A. Hubbard

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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.
   Check vertical alignment of the ECE beam.

2. Background
   Discuss Physics basis of the proposed research, Prior results at Alcator or elsewhere, and any
   related work being carried out separately.
   The entire ECE system had to be moved and reinstalled during the shutdown. While we have mechanically aligned to be as close as possible to our original position, the possibility of a slight angular shift remains. An error of 1 degree would correspond to 5 cm in vertical position at the plasma.
   Results in the last operating period showed that varying our beam position on a series of reproducible discharges is a good way to characterize and correct for any uncertainty.

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.
   On a series of reproducible discharges, vary angle of final mirror between shots (via PLC). Look for position which gives maximum temperature and most peaked profile.

4. Resources

4.1 Machine and Plasma Parameters
   Give values or range for:
   Toroidal Field: Any constant value.
Plasma Current: Not critical, but lower values (< 500 kA) are preferable since they give a well defined Te peak.

Working gas species:

Density: Must be reproducible.

Equilibrium configuration (if possible, refer to database equilibria): Vertical position stable.

Pulse length, typical current & density waveforms, etc. Refer to database or sketch desired waveforms: Current, field and density must all be constant for a period of at least 60 ms.

4.2 Auxiliary Systems

RF Power, pulse length, phasing:

Pellet Injection (species):

Impurity blow-off injection:

Special gas puffing:

Other:

4.3 Diagnostics

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

ECE, TCI

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.)

5. Experimental Plan

5.1 Run sequence plan

extended run period (10 hours maximum), etc.

One run (or part of run). It is anticipated that this can be carried out in a 'parasitic' mode with any other experiment requiring reproducible discharges. RF, injection etc. are compatible as long as there is a stable period beforehand.

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.

Approx 10 shots, with same conditions.
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.

Reduce uncertainty in vertical ECE position from $\sim 5$ cm to $\sim 1$ cm. This will be
important for confinement and other databases. It should therefore be carried out early in
the run period, as soon as reproducible discharges are possible.

7. References

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

MP 018, which was successfully completed 08/05/93 in parallel with an RF run. This
resulted in a 4 cm correction to zbeam.