Title

User: B. Badger

Facilitator: U.W. Scientist

Device: BRB

Date: November 5, 2019

Proposal Number: To be assigned

# Abstract

Please provide a brief description of the proposed research to let your operator, diagnosticians, and the rest of the scientific team know what it is you’re trying to accomplish. This is an excellent opportunity to make a first draft of an abstract for a proposed presentation or publication.

# Objectives of Experiment

1. A list of objectives that will give you and the WiPPL team an idea ofthe scope of the experimental study.
2. This list should help you determine what constitutes a complete dataset to address the big picture described in the Abstract.

# Run Plan

Describe the range of plasma conditions and measurements that are required to complete the listed objectives. Given the setup time needed to operate the BRB in a particular configuration, experiments are typically conducted in multi-day campaigns. WiPPL staff will help translate the desired plasma conditions into operational scenarios as part of the collaborative development of this document. They will help you consider contingency planning such as required conditioning, anticipation of non-ideal shot conditions, *etc.*

You can also help by specifying any prioritization you may have among different planned plasma conditions. You could indicate your priorities in a table like Table 1.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Shots | Fueling | Heating (kW) | Density (m−19) | Temperature (eV) |
| 50 | He | 250 | 1018 | 5 |

Table 1: Summary of run plan. Try to quantify the number of shots needed in each run condition based on statistical uncertainty considerations. Typical operation of MST anticipates reproducible plasma conditions to facilitate ensemble averaging over many plasma discharges (or shots).

After determining the requisite number of shots, estimate the number of run days required to acquire the shots. Indicate a separate planned number of contingency days if machine conditions warrant it.

# Heating & Control systems

## Cathodes & Anodes

Specify the number and location (longitude and latitude) of each LaB6 cathode (up to 10) and anode.

## Electron Cyclotron Heating

Specify whether there will be any ECH applied. We have two 20 kW magnetrons, each located on opposite hemispheres.

**4.3 Plasma Guns**

**4.4 Compact torus injector**

# Diagnostics

To help convey the level of interest in having a diagnostic available for the experiment, there are three categories Table 2:

* **Essential**: I will not be able to complete my objectives if these diagnostics are unavailable. Do not schedule the run until they are available.
* **Desired**: My post-shot analysis will make use of data from these diagnostics, but I won’t postpone the run if they are not available.
* **Non-essential**: I have no plans to use data from these diagnostics. If others can make use of data from these diagnostics they will be responsible for coordinating support.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Diagnostic | Needs operator | Essential | Desired | Non-essential |
| mm-Wave Interferometer  3-axis Linear Hall sensor array  Radially scanning Mach probe  Triple probe  Visible spectrometer  Fabry-Perot Interferometer  Other (please specify) | No | X |  |  |

Table 2: Diagnostic needs

For probes that operate on the angular sweep stages, it is helpful to specify the density of measurements desired for the angular section covered by the probe to help estimate the number of discharges needed.

# Preparatory Work

Describe any work in the machine area that must be performed before shots dedicated to the objectives listed can begin.

* List any machine modifications
* or equipment installation
* or calibration and alignment needs

# Post-shot Analysis

Data will be stored on standard MDSplus nodes. If you are adding a diagnostic, do we need to add additional nodes to the MDSplus tree for this work?

If there is any post-shot analysis where will the resulting output files be stored? This could be in a user directory on one of our servers.

# Clean up

List any steps that need to be taken to return the machine to normal operation. List any equipment that needs to be removed from the machine area and specify where it is supposed to go.