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INTRODUCTION

The national fusion mission and goals are deeply consonant with the mission and core competencies of the Laboratory, including the educational goals of the Laboratory and Princeton University. The current challenge to the Laboratory is to find the most cost-effective methods possible to help the DOE achieve these national goals.

The Experiment Department serves as the home organization of the experimental research staff who are directed toward developing and implementing a science based fusion research program. Science Focus Groups have been established to drive forward scientific efforts in the five major fusion science areas that are key to the eventual realization of an attractive fusion reactor concept: Turbulence and Transport; Macroscopic Stability; Wave-Plasma Interaction; Fast particle Physics; and Plasma-Boundary Physics. The major goal of the research staff and these groups is to focus on the highest priority science issues and to help develop comprehensive research programs that effectively use the Laboratory's resources to advance the national and international fusion science programs.

RESPONSIBILITIES

The Experiment Department is responsible for coordinating the experimental research staff activities by working with the projects to establish assignments consistent with the research program and staff qualifications, and to evaluate the staff performance toward carrying out the research program and advancing the development of fusion plasma science. Science Focus Groups working with the Computational Plasma Physics Group are organized within the Experiment and Theory Departments to help provide a framework for linking research activities within the Laboratory, with PPPL research off-site, and with the fusion research program generally. Advances in computational capability are effectively applied to experimental data analysis codes and to the development of predictive theory codes, which can lead to optimized tokamak performance, proof-of-principle alternative magnetic fusion concepts, and emerging concepts.

Specific strategic steps which are supported by the Experiment Department and the Science Focus Groups comprise a progression from the evaluation of existing data bases, to the extension of these to cover exploration of advanced tokamak physics issues, to using established physics considerations for tokamaks in support of the development of proof-of-principle alternative magnetic fusion reactor concepts and emerging concepts. In addition, the groups foster the interplay/integration of fusion energy science in the scientific community at large. To accomplish these steps, the groups help develop the priorities for the research to be conducted.

Within the Department there are two technical divisions, the RF Technology Division and the Diagnostic Development Division, which are directed toward advancing RF and diagnostic capabilities in support of the research program. For these roles, the Experiment Department is responsible for coordinating technical support assignments with the Engineering Department to balance resources between the RF and diagnostic efforts of the projects. Also, the development of new RF and diagnostic techniques are undertaken to offer extended experimental capability in pursuit of advancing the control of plasma profiles and measurement of the critical plasma parameters.