University Support

Goal:
The purpose of this program is to apply PPPL's expertise in plasma science and technology to support a broad range of University research programs funded by OFES. This program also allows PPPL scientists and engineers to benefit from new insights and experiences gained by working with these universities.

Approach:
The approach of this program in FY '98-FY '99 has been to support about 15 different University programs, particularly those involved with experimental research on alternate fusion concepts. Starting in FY '00 and continuing into FY '01 and beyond, the focus of this program will broaden to include a wider range of University research programs in plasma science. In particular, this program will serve as means of "scientific outreach" to smaller groups and institutions which could benefit most from PPPL's expertise in plasma physics and engineering.
Specifically, this program will provide funding to support PPPL scientists and engineers to collaborate with Universities in such areas as: experimental device design, diagnostics, data acquisition and analysis, plasma heating systems, engineering, and theory. All types of OFES-funded University research will be supported, including innovative concepts in both MFE and IFE, and basic and applied plasma science. It is expected that each of these support programs will complete its initial goals after about 3 years.
Technical Progress FY '99-'00 (Highlights):
About 15 different University research programs were supported through this program in FY '99- FY '00. Many of these have continued for 2-3 years due to strong mutual interests of the University and PPPL. About 25% of these support programs were new for FY '00. Highlights of the technical progress for a few of these programs are below. The principal contact at the University is shown in parenthesis.
Auburn (Knowlton): design support for CAT stellarator, and engineering and physics design for the Compact Toroidal Hybrid (CTH) proposal
Caltech (Bellan): development of ultra-soft x-ray pinhole camera diagnostic for the solar flare simulation experiment
Columbia (Navratil): development and installation of toroidal flow diagnostic using spectral line filters, RF heating system support
MIT/Columbia (Kesner, Mauel): responsibility for the engineering design of the launcher / catcher system for the Levitated Dipole Experiment (LDX)
Swarthmore (Brown): diagnostic and physics support for SSX spheromak experiments, e.g. spectroscopy and Langumir probes
UCLA (Taylor): engineering support for electrical power systems for ET, design of a cryogenic TF system, loan of SCRs, fluctuation diagnostics
UCSD (Luckhardt): development of a scintillator-based diagnostic for 2-D imaging of edge turbulence in the Pisces device
Wisconsin (Talmadge): design of optical system for HSX Thompson scattering, support for design of 2-D ECE diagnostic (w/UC Davis), participation in field line mapping, loan of soft x-ray diagnostic

Washington (Hoffman): measurement of ion temperature in STX FRC experiment, participation in FRC experimental program, development of theory for dynamic stabilization of FRCs

Future Accomplishments (FY '01-'02):
The plan for this program in FY '01 and FY '02 is to support a broad range of University research programs, and to extend more support to the smaller University groups and institutions which could most benefit from PPPL's expertise in plasma science and technology. The existing programs will be continued and completed where possible. These include:
Auburn - engineering design Compact Toroidal Hybrid CTH (if funded)
Caltech - x-ray imaging diagnostic development
Columbia - diagnostics and experiments on CLM and HBT-EP
Illinois - support liquid metal experiments
Maryland - engineering for Maryland Centrifugal Torus (if funded)
MIT - diagnostics for LDX and VTF
Swarthmore - diagnostic and experimental support
UCLA - diagnostic support for ET and LAPD
UCSD - diagnostic support for turbulence experiments
Wisconsin - diagnostic support for Pegasus, HSX, and MST
Washington - experimental, diagnostic, and theory support for FRCs
New activities will be developed in the general areas of innovative MFE experiments, basic and applied plasma science, engineering support (particularly for smaller groups), and IFE research.