Budget Justification

Personnel and Benefits

Funds are requested to provide 1 month of summer salary per year for the PI, Prof. Troy Carter and faculty Co-PIs Prof. Walter Gekelman and Prof. George Morales. Co-PI Dr. Steve Vincena is supported for 11 months at 67% time (1 month of 100% support is requested as part of the NSF budget). Other research staff are supported for 12 months at 67% time: Dr. Bart Van Compernolle and Dr. Shreekrishna Tripathi. As a large fraction of the time of the research staff and technical staff is spent fabricating equipment for BaPSF, the remaining percentage of Dr. Vincena (for 11 months), Dr. Van Compernolle, and Dr. Tripathi's time is covered under Fabrication (below). The facility requires a full-time administrator to handle the work load dealing with running the facility and external users, as well as travel and workshops; this is outside of the normal services provided by the University as part of the F&A charge. Support for 100% of Meg Murphy's salary is therefore requested. Support for a full-time IT specialist is requested; this person would be in charge of hardware and software development and maintainence, including Labview-based control software for the facility. Salary for other personnel are catagorized under Fabrication, below.

As the facility supports some of the research of the local group, five full-time graduate students are included in the budget. The specific salaries and benefits for each individual are determined by strict guidelines set by the University of California and subject to rigorous review. Each listed salary is based on the individual's current level and increased each year for cost of living and merit increase (5% COLA for academic personnel, 4% COLA for staff, 7% for faculty merit increases which occur every few years). Benefits are the actual benefits of each employee. Fringe benefits are charged to all senior and other new personnel at a composite rate set by the Regents of University of California. PI and Co-I salaries are charged at a rate of 12.7%. Postdoc salary is charged at a rate of 19%. Meanwhile, the graduate student researchers are charged at 1.3% during the academic months and 3.0% during the summer months. Existing employee use actual rates. Benefit rates are increased 2% each fiscal year.

Equipment and Fabrication

Each year there are funds allocated for continuing modification to current equipment. The actual needs in this category vary from year to year (e.g. repairing/replacing pump-down stations, mechanical and electrical components of the LAPD, etc.). Each year, equipment in support of user experiments and campaigns is designed and constructed by the BaPSF staff.

Other planned fabrication items are called out in the budget and include: High frequency RF amplifiers for wave excitation (e.g., whistler, lower hybrid, Alfvén); Fabrication of 200 GHz interferometers (over the 5 year period funds to construct 5 new interferometers are requested to provide 5 axial locations of line-integrated density measurements; a shielded fast-wave antenna to be used for high-power fast wave launch (in support of local group and campaign research); 3 valve/port boxes for insertion of large-sized apparatus into LAPD; amplifiers for diagnostic signal conditioning (low frequency and high frequency, called out separately); transisitor switches for power supplies/drivers for wave excitation and biasing; new probe drives that will allow three-axis positioning of probes in LAPD; fabrication of probes (Langmuir, Mach, emissive, magnetic, dipole, etc.) happens continuously,

and funds are requested to support this; vacuum hardware (KF clamps, o-rings, pumpdown ports, etc).

In the first year funds are requested to fabricate a new large area LaB_6 cathode source, including internal (to the vacuum chamber) magnets. The materials for fabricating the source will be purchased in the first year with construction continuing into the second year. As part of the fabrication budget, funds to support the the salary (all or part) of several staff members is requested; the percentage time they spend on fabrication of equipment for the facility is charged to a different account on which no overhead is drawn (consistent with the rules on fabrication of equipment at UCLA). Under fabrication, funds to support Dr. Vincena (33% for 11 months), Dr. Tripathi (33% for 12 months) and Dr. Van Compernolle (33% for 12 months) are requested. In addition, the Technical Director, Zoltan Lucky is supported 75% time under fabrication, the Project Scientist, Dr. Pat Pribyl, is supported 100%, as are the two technicians, Marvin Drandell (100%) and Tai Ly (100%).

There is a budget item for replacement/upgrade of basic facility equipment (e.g., scopes, meters). This is necessary, as there comes a time when it is not cost effective to repair old equipment and it must be replaced. Funds are requested for storage of data generated by BaPSF users and the local group. Experimental runs can generate up to 1 TB per week of data; continuous investment is needed to provide sufficient high-quality, backed-up storage space for data. In addition, funds for data analysis servers are requested. The servers are used both by the local group and by BaPSF users. Funds are requested for a new fiber-coupled spectrometer (and CCD) for Doppler spectroscopy of ions (helium, argon) for flow and ion temperature determination. Funds for replacement and new vacuum pumps are requested.

Travel

The travel budget allows the PIs, research staff, and graduate students to attend major national scientific meetings such as APS-DPP and to participate in international meetings such as the International Conference on Plasma Physics (ICPP), European Physical Society Plasma Physics meeting (EPS), the Interrelationship of Plasma Experiments in the Laboratory and Space (IPELS), the Trieste Summer School on Plasma Physics and major topical workshops. Travel to these various meetings is necessary to present the work done at BaPSF to wide audiences and to fulfill the "Broader Impact" goals of the proposal. Funds are requested for 7 domestic trips (APS DPP or AGU) and 3 international trips (e.g. IPELS or EPS Plasma Physics) per calendar year. We have assumed that the trips will be 1 week long each in budgeting. The trips will be made by the PI and Co-PIs, research staff and graduate students who will report on the latest research taking place at BaPSF.

Other Direct Costs

The materials and supplies category includes funds for necessary small replacement parts as well as for electrical supplies; the amounts requested are consistent with spending in these categories over the last 5 year period of support for BaPSF. $30k has been allocated for scientific publications as a result of this project. The additional direct costs include the following. There are three laser systems (two Nd:YAG lasers and a pulsed tunable dye laser) used in support of several experiments and for diagnostics. All the lasers must be kept under service contract, as a single repair on any of them equals the price of a year-long service contract. The lasers are fragile and usually break more

than once a year. The service contract also includes a yearly alignment to bring the laser up to its quoted specifications. Funds are requested for yearly replacement of laptops and computers, both for research staff use as well as for use in the lab (connecting to RGA's, monitoring of laboratory equipment and control systems). Programmable power supplies are used throughout the lab (e.g., for antenna RF drivers, biasing circuits, Langmuir probe measurements); request for purchasing (or replacing) 1 power supply per year is included.

Participant support costs are requested in order to facilitate Campaign workshops and Users Group meetings at UCLA. One event per year (either a campaign workshop or the biannual on-site Users Group meeting) is envisioned. The funds allocated will support the travel of 10 people per year to these events (and may be used to support partial payment of travel for more).

The GSR fee remissions for the current academic year (2015-2016) are at $15,440.48. An estimated 5% increase per year is applied. We request funds for GSR fee remission for 5 graduate students for three academic quarters on each year of this project.

`https://grad.ucla.edu/gss/library/1516remissionsgsr.pdf`
`https://grad.ucla.edu/gss/appm/gsr10stepscale.pdf`

The Technology Infrastructure Fee (TIF) is a consistently-applied direct charge that is assessed to each and every campus activity unit, regardless of funding source, including units identified as individual grant and contract awards. The TIF pays for campus communication services on the basis of a monthly accounting of actual usage data. These costs are charged as direct costs and are not recovered as indirect costs. TIF is based on a full time employee (FTE) and is calculated at $33.28 per FTE per month.

Indirect Costs

Facilities and Administration (F&A) costs are federally negotiated rate applied to projects as a percentage of the direct costs. The UCLA F&A rate on the Modified Total Direct Cost (MTDC) is 54%. MTDC consists of all salaries and wages, fringe benefits, materials and supplies, services, travel and the first $25,000 of each subaward regardless of the period covered by the sub-grant or subcontract. Graduate student fee remissions, equipment over $5,000, and participant support costs are excluded from MTDC. On April 27, 2011, the University of California and the United States Department of Health and Human Services (the responsible Federal audit agency) entered into a new facilities and administrative (F&A) cost rate agreement for UCLA. This agreement establishes facilities and administrative cost rates for the period July 1, 2010, through June 30, 2016. The F&A rate pertaining to this budget is 54% of Modified Total Direct Costs for on-campus research. A copy of the F&A rate agreement can be accessed at: `http://www.research.ucla.edu/ocga/Documents/F_A_Rate_Agreement_4-27-11.pdf`.