Budget Justification

The total budget request for this five year CAREER project is $435,659. During the first year of this project, the major expense, $21,500, will be related to upgrading the vacuum systems and magnets on the FPS device. Computers, a camera system ($5,000), and other data acquisition hardware and software ($5,000) will also be purchased during the first year. An optical table and the initial optical components for the PIV ($3,000) and other laser diagnostic systems ($5,000) will also be purchased during the first year.

During the second year, the major expense will be the purchase of the PIV laser system at $35,000. Additional optics for the PIV ($4,500) will also be purchased. In the third year, major equipment costs include a CCD spectrometer ($7,500), an RF generator ($15,000) for additional plasma heating, and additional optical equipment ($5,000). In the fourth year, a spectrum analyzer will be purchased ($15,000) to investigate fluctuations in the structure of the plasma crystals. In the fifth year, $10,000 is allotted to make improvements to the vacuum systems and to add additional ports to facilitate the studies on controlling the transport of the dust particles in the plasma. Each year, $6,000 is allotted to purchase computers and computer hardware for data acquisition.

Annual materials and supplies costs total $11,000. This total includes basic laboratory supplies ($1,500), argon gas usage ($1,000), vacuum supplies ($1,500), electronics ($5,000), computer software ($1,000), and office supply charges ($1,000). Additionally, $1,000 is allotted each year towards publication costs.

The remaining costs of this project are for support of personnel: the principal investigator, undergraduate students, and participants in the summer research program. The University contributes to this project by providing laboratory space and providing support for additional undergraduate students and graduate students to participate in this project. Support for the undergraduate student includes a stipend (including living expenses) of up $4,500 for the summer and up to $2,500 during the academic year. During the first two years, one undergraduate student will be directly supported by this project. During the remaining three years, two undergraduate students will be directly supported.

Support for the PI is for 2 months during the summers (for all 5 years) using a 5% cost-of-living adjustment. The travel budget provides support for the personnel (students and the PI) participating in this project to the present the results of their research at scientific conferences (American Physical Society - Division of Plasma Physics; National Undergraduate Conference; etc.) throughout the duration of this project. Travel for the PI is supported at $1,000 per trip and for the students, at $650 per trip.

The summer program will be supported at $9,000 per year. This total includes: a $4,000 stipend for the high school teacher; a $1,500 stipend for the high school students; $2,500 towards the development of the demonstration project; and, $1,000 to defer other costs such as mailing literature, office supplies, etc.

In each of the yearly budgets presented on the following pages, several categories are used. Personnel costs refer to salary support for the PI and support for students. Materials and Supplies represent the basic costs to maintain day-to-day operation of the experiment. These costs include small electronics (multimeters, wiring, cables, chemical supplies, etc.), raw materials (tubing, ceramics, etc.), office supplies (paper, phone charges), etc. Major equipment costs are for permanent laboratory equipment

(i.e., the vacuum vessel, electromagnets, etc.). The indirect costs are computed as 55% of the support for the PI as approved by DHHS.