

PHYSICS BUDGET NARRATIVE

PART I: FY22 ANNUAL REPORT

Major Accomplishments for CY21

1) Scholarly productivity:

- a) Physics Faculty worked with 53 ISU students, on individual research projects. Sixty five percent of the 21 papers published by physics faculty had student co-authors. Additionally, the faculty presented 18 papers at major conferences and 41 papers at regional conferences, and won two new NSF grants.
- b) The physics faculty won two new NSF grants with a total value of \$715K as well as smaller grants from industry partners Brewer Science Incorporated and Collins Aerospace. This includes A grant to purchase a SEM for the university.
- c) Dr Caplan's Science videos with the Kurzgesagt GmbH and PBS Digital Studios have had over 85 million combined views *this year* in English, German and Spanish. Additionally, his work has been extensively covered in the popular press.

2) Awards:

- a) Dr. Caplan won the ISU Research Initiative Award and has been made a KITP Scholar.
- b) Hannah Alperstein won the Bone Scholarship and Naomi Satoh won the Noyce Scholarship for Physics Teacher Education (National Scholarship)

3) Service

- a) Physics faculty acted as referees for 22 papers submitted to 19 different Tier-I journals, served as proposal reviewers for 4 grant applications submitted to 4 different agencies. Additionally, many faculty members serve in leadership roles in their research communities such as editing journals and heading committees.

Major Objectives for FY22

In FY 22, we had a number of goals, some of which were based on the budget and others more in the line of strategic planning.

From a fiscal perspective, the most important goals for the department were to fix some structural flaws in our department funding of personnel. Our first three objectives are listed below with a brief rationale and description of the progress made.

Objective: New Laboratory Support Position:

Strategic Plan Alignment: Department: *Goals 5 & 7*; CAS: *Goals 1.1 & 2.3*; ECE: *Goals 1.B & 2.A*

Rationale: The position includes several standard support duties such as lab set-up and take-down, storeroom management and equipment repair, and demonstration equipment support. It would also include faculty support roles in designing and developing new demonstrations and lab exercises, and support for the department's co-curricular projects (ISU solar car, trebuchet, and Innovative Design Project). This position is nearly ubiquitous for physics departments across the nation and will become even more essential as we move towards an on-campus engineering program.

Requested Funding: (permanent) \$50,000

Progress: The request was not funded

Funding: We continue to limp by using internal reallocations to pay Dr. Rutherford to partially fulfill the duties.

Objective: Upgrade the Planetarium Coordinator to Planetarium Director with a 12 Months Contract

Strategic Plan Alignment: Department: *Goal 9*; CAS: *Goals 4.1 & 4.2*; ECE: *Goals 4.A & 4.B*

Rationale: With the renovation of the Planetarium complete, the facility has become much more diverse in its offerings. In addition to traditional planetarium shows, the facility now hosts ISU courses and multiple other types of events. The Director needs to be present 12 months of the year to ensure smooth operation. Currently, planetarium receipts are used to support the coordinator for time not covered in his contract. These funds would fix a structural flaw in the department's budget and allow planetarium revenue to be used for planetarium maintenance, employing student workers and purchasing new shows. Additionally, the planetarium director could teach two sections of Astronomy per year.

Requested Funding: (permanent) \$14,607

Progress: The request was not funded.

Funding: We continue to get by using a mix of planetarium income and physics department funds to pay the Director for the full 12 months. This has been a particularly challenging year since the planetarium has been closed and thus the department has had to fully fund the extra months.

Objective: Undergraduate Teaching Assistants and Student Help

Strategic Plan Alignment: Department: *Goals 1, 4, & 7*; CAS: *Goals 1.1 & 1.3*; ECE: *Goal 2.A*

Rationale: Since the physics department has no graduate students, and therefore no graduate assistantships, the department's Undergraduate Teaching Assistant (UTA) program was established to recruit students with sufficiently good academic records to assist in grading, and, for those with the experience and desire, teaching Gen Ed and introductory physics labs. We also use undergraduate student secretaries for times when the main office staff is out, or when additional office help is needed. Much of the cost is now supported by our permanent GA funding, but the rise in minimum wage will require additional funding.

Requested Funding \$59,443.

Progress: All of UTA needs were met for the year .

Funding: With a combination of Permanent GA funding and additional CAS funding for IC, we were able to fully staff our undergraduate labs.

Our next set of goals centered around improving the undergraduate experience in physics, both for the service courses and for our majors. This is very important for recruitment and retention of high-quality students in a very competitive environment. From the fiscal end we proposed the following objectives designed to improve the physical space for the students and to improve their lab experience.

Objective: Complete the Renovation of Physics Classroom, Moulton 309

Strategic Plan Alignment: Department: Goals 4 & 7; CAS: Goal 2.3; ECE: Goal 2.C.1

Rationale: Moulton 309 was last upgraded over 20 years ago and is definitely showing its age. Additionally, the room was set up so that the instructor for the class was able to use a Smart Board and a single white board. Several of our new faculty member prefer to rotate the classroom 90 degrees where there are three large white boards along the wall. In its old configuration, (with 4 rows of tables) it was not possible to use the three white boards. The original estimate on renovating the room was \$29,000. This included painting, carpeting, electric work and replacing the lights and ceiling. When the furniture was included the estimated cost went up to \$52,000 (this included a significant cost increase for the ceiling replacement). The original \$29,000 was funded with \$19,500 from AEF (CAS) and \$9,500 from the Physics department.

Requested Funding (AEF) \$20,000.

Progress: A pared down renovation (no ceiling/lighting work) has been completed and the room is ready for use.

Funding: The project was brought to completion for the fall of 2021 with the \$15,000 that was SBCed from FY21 and FY22

Objective: Renovation of Physics Teacher Education Classroom, Moulton 307B

Strategic Plan Alignment: Department: Goals 4 & 7; CAS: Goal 2.3; ECE: Goal 2.C.1

Rationale: Moulton 307 is a small classroom (approximately 12 students) specifically setup for our Physics Teacher Education Program. This room was last updated over 20 years ago and is showing its age. In recent years, we have also been using the room for teaching our smaller upper level courses. To update the room, we plan to replace the window shade, replace the furniture, paint and carpet.

Requested funding: (AEF): \$18596

Progress: The request was not funded, but we used some excess fund form the MLT 309 project and other SBC funds .

Funding: The project was completed for use for the fall of 2021.

Objective: Renovation of Physics Student Tutoring Room, Moulton 207 and 213

Strategic Plan Alignment: Department: Goals 4 & 7; CAS: Goal 2.3; ECE: Goal 2.C.1

Rationale: Moulton 213 is the student lounge and tutoring center. The Physics Club uses the room to provide free tutoring for students in all of the lower-level courses. The room also has computers, a microwave, a refrigerator and coffee pot. Physics students spend a lot of time working together and socializing in the space. It is at the heart of the undergraduate experience in the department. We were able to have the room painted a couple of years ago, but it is still badly in need of updating. Moulton 207 is the Physics Storeroom and is immediately next door. We intend to take a portion of Moulton 207 and wall it off so that the student space can be enlarged with additional computers and a quiet space. A request has been sent to facilities for an estimate on this project.

Requested funding: (AEF): A request for an estimate is pending

Progress: The request was not funded, however we used department funds to make some minor improvements.

Funding: Without funding, no significant work will be done.

Objective: Recap of Computers in General Education Lab.

Strategic Plan Alignment: Department: Goals 2, 3, 4 & 7; CAS: Goal 2.2; ECE: Goal 2.A

Rationale: The computers in Moulton 202, our PHY 102 computer lab are all at least 10 years old and in need of replacing. Whereas the computers are still operational on an old version of the Mac operating system, they cannot run newer operating system. The net effect is that the new versions of the software that we use for the course will not run and the lack of updates to the operating system can become a security risk. The computers are very heavily used throughout the semester, with 600-700 students enrolled in the class (per semester).

There are 20 computers in the room (plus another 12 in the experimental portion of the space), all of which are at least 10 years old. Our systems manager has priced acceptable models (Mac mini with monitor and associated hardware) at approximately \$1,200 per seat.

Requested Funding (AEF) \$24,000

Progress: No progress has been made. We continue to use the older model computers.

Funding: Not funded.

Objective: Recapitalize the Lower Division Laboratories

Strategic Plan Alignment: Department: Goals 4, 5 & 7; CAS: Goals 1.1 & 2.2; ECE: Goal 2.A

Rationale: A good portion of the equipment used for teaching our undergraduate labs is older than the students, and much of it is reaching the end of its useful lifetime. The problem is exacerbated by the fact that we have not had a lab support specialist to maintain the lab and demonstration equipment (see Priority #1). Students deserve to use equipment that is more representative of current technology. We are requesting both general-purpose equipment that can be used in a number of different labs as well as some specific equipment for particular experiments.

Requested Funding (Temporary) \$55,843.

Progress: The request was not funded. We will continue to improve our labs as funding allows.

Funding: We have some funds (\$20,000) from an SBC for Lab/Computer recap, but there is way more demand than funds available. We will make as much progress as possible

Objective: Add Modern Experiments for Upper Division Laboratories

Strategic Plan Alignment: Department: Goals 4 & 8; CAS: Goal 1.2; ECE: Goal 2.A .

Rationale: As of now, almost all of the experiments offered our Advanced Lab course were originally carried out in the early-mid 20th century. Dr. Manna plans to develop two state-of-the-art experiment that were originally carried out only a few years ago. These experiments will provide the students a sense of two modern experimental techniques. They will also be of benefit to students in an Electrical Engineering program.

Requested Funding: (Temporary) \$20,636

Progress: No progress has been made on these particular experiments, although we are always striving to improve the lab experience.

Funding: Not funded.

Objective: Fume Hood for Advanced Labs

Strategic Plan Alignment: Department: Goals 2, 3, 4 & 7; CAS: Goal 2.2; ECE: Goal 2.A

Rationale: With recent hires with new expertise, our upper division labs are undergoing significant changes. The instructors that teach our upper division labs (PHY 270 and PHY 370) as well as our electronics course (PHY 375) have a background in solid state physics/chemistry They are planning on introducing some very exciting state of the art experiments into the courses that will provide our students with highly valuable skills and modern laboratory techniques; however, they necessitate the use of a fume hood (which is lacking in Moulton Hall). Among the experiences that will be available to students are making circuit printed boards, fabricating organic solar cells, and producing and

characterizing nanomaterials. The hood could also be used by Dr. Biswas, Dr. Manna and Dr. Marx in their research, when not needed by one of the courses. (See Appendix for more details.) The estimate from facilities to complete this work is \$89,225. The department has approximately \$20,000 that we can commit to the project. We are requesting funding for the difference.

Requested Funding (AEF) \$69,225

Progress: Facilities is in the process of installing the hood as of 3/17/22.

Funding: Fully funded through AEF funds and \$20,000 of Physics GR funds that were SBCed for the project.

A third group of objectives focuses on upgrading the departmental research infrastructure. The fume hood listed above will double as research infrastructure for the department. We had the following additional objectives (both successful).

Objective: Acquisition of Scanning Electron Microscope (SEM) for ISU

Strategic Plan Alignment: Department: Goals 2, 3, 4 & 7; CAS: Goal 2.2; ECE: Goal 2.A

Dr. Biswas has submitted a NSF MRI proposal for obtaining a Scanning Electron Microscope as a shared resource for ISU. She has identified 10 major users for the facility from Physics, Chemistry, Biological Sciences, and Geology/Geography and an additional 15 occasional users from ISU, Bradley University, and Millikin University. Access to the instrument will have a profound impact on the type and level of research that can be performed on campus and will also be a valuable resource for instructing our students using state-of-the-art equipment.

Requested Funding (temporary) TBD (\$20,000)

Progress: The SEM has been purchased and we are working out the details of having it installed in Moulton Hall. Expected delivery and setup in June or July 2022.

Funding: Dr. Biswas succeeded in obtaining a NSH-MRI grant of over \$400,000 to purchase the instrument. The major users have added a combined \$28,000 to purchase a vibration damping platform to improve the performance of the instrument. The department is waiting to see how much additional funds will be required to prepare MLT 301 for installation.

Objective: New Parallel Computer

Strategic Plan Alignment: Department: Goals 2, 3, 4 & 7; CAS: Goal 2.2; ECE: Goal 2.A

Rationale: Numerical computation lies at the heart of the ISU physics program and is what distinguishes us on the national stage. We infuse all our physics courses with computational projects starting from the freshman year. The most important tools for our computational physics program are parallel computers used in large scale computations. The current departmental machine is six years old and may be nearing the end of its life expectancy. With the importance of high-performance computing in physics, it is imperative that the department maintain a parallel machine to be used in teaching as well as research. We were able to SBC \$10,000 last year to go towards the estimated purchase price of \$30,000

Requested Funding: (temporary) \$20,000.

Progress: Rather than purchasing our own parallel machine(s), the department and Dr. Caplan have decided to invest our resources in the new much larger parallel machine owned by Academic Computing.

Funding: The department is contributing \$15,000 that was SBCed last year towards the purchase of additional CPU nodes and Dr. Caplan is contributing his remaining \$30,000 if start-up funds towards the purchase of GPU nodes.

Our fourth group of objectives center around projects in curriculum development. Currently at least half of our incoming freshmen identify as Engineering-Physics students. With the coming of an engineering program, we anticipate that we will lose a significant number of our incoming students to engineering (at least initially). To

partially alleviate these losses, we are working on developing additional sequences in the physics program. The first of these is Biophysics which was approved this spring. The second is a sequence in Space and Astrophysics. With our recent hire of Dr. Caplan, all of the faculty are in place to create a first-rate program. Prospective students routinely ask us about the availability of such a program and we are very excited that it should come to pass in the near future. A final consideration is to create a Master's level program in physics. We are one of only two departments in the university that does not offer a Master's degree. Once again, with the advent of the engineering program, this is a good time to consider adding the M.S. degree. It gives the possibility of having graduate assistants for teaching discussion and lab sections for the engineering students. It will also assist the faculty in maintaining a high level of research productivity even with the loss of a portion of the undergraduates. We have submitted a plan to the Provost Office along with a Financial Impact Fund and are awaiting their input.

Equity Diversity and Inclusion is a major issue in STEM disciplines, particularly physics and engineering. The AIP has a number of programs related to DEI issues. I plan to attend the annual physics chairs conference where it will be a major topic of discussion. Hopefully I can bring back actionable ideas for the department. We are fortunate to have two excellent women faculty members. Women only make up about 15-20% of new PhDs in physics.

This past year, the vast majority of the faculty and staff in the department attended the "Courageous Conversations" workshop. Additionally, Dr. Rutherford and Dr. Holland are members of the STEM DEI task force that is headed up by CeMaST. Finally, before the fall semester, we will be holding a department retreat to update our strategic plan. I anticipate that DEI will be a major focus for us as we move into the future.

Internal Reallocations and Reorganizations in FY22

Department/School: Physics

Temporary Variance:	\$8,000 from CAS for Rutherford CeMaST buyout
Permanent Reallocation:	\$0
Temporary Reallocation:	\$9920: Willmitch 10 th and 11 th months, April and May 22 \$2000: Summer projects for updating IAI July/Aug2021, \$2,000 for Caplan Physics Year 3 startup \$1,000 transfer to IBA conference \$1,000 for ISAAPT conference \$9,000 Rutherford for lab setup (\$8000 CeMaST +\$1000 Physics contractual.) \$3000 Preview Pay (summer 21) \$2000 for summer physics teacher workshop

College:

Dean's Allocation (Tech Tuition):	\$0
Permanent Funding:	\$0
Temporary Funding:	\$8,000 for Caplan Year 3 startup \$5,000 for Biswas Physics Year 2 startup \$10,000 ILP grant matching for post-doc \$6,000 travel funds \$10,000 to purchase anti-vibration platform for SEM \$250 for ISAAPT conference

Provost:

Instructional capacity	\$61,774 Permanent NTT \$32,566 Permanent GA \$69,225 for fume hood in advanced lab (AEF) \$3,000 for anti-vibration platform for SEM \$0 Base Provost IC \$0 Supplemental Provost IC
Temporary Funding:	\$5,000 Biswas year 1 startup EDEP
RERIP:	\$5000
PE:	\$0

Foundation (Unrestricted): \$33,713 (all other funds have designated uses)

A significant issue for us this year has been the loss of the Office Manager, who left the university in August 2021. This has caused a plot of additional work to fall on the shoulders of the Assistant to the Chair. She has done an outstanding job in picking up the slack, but we are still falling behind without the

additional staff member. We have begun the process of hiring a ½ time replacement for the Office Manager, and hopefully we will be able to attract a viable person to fill the position.

The department once again has an excess in our NTT budget of about \$18,000. This can be used to mostly backfill the deficit in our GA budget. It would be optimal to make a permanent transfer of \$15,000 from the NTT line to the GA line. The \$69,225 AEF funding is being used to install a fume hood in our advanced lab. This will open up new experimental opportunities for our upper-level physics majors and also will provide a much-needed resource for Dr. Biswas' research program. We appreciate the \$3000 commitment to help offset the cost of purchasing the anti-vibration platform for the new SEM.

The department appreciates the \$10,000 commitment from the college to help offset the cost of purchasing the anti-vibration platform for the new SEM. This is a large expense, but necessary for the SEM to perform well given the rooms that are available for installation. We also appreciate the \$250 to support the ISAAPT meeting that is being hosted by the department. This conference typically brings in 30-50 high school teachers from around the state and acts as a major recruitment event for our program.

PART II: FY22 PLANNING DOCUMENT

Major Objectives for FY23

Once again, the most important goals for the department are to fix some structural flaws in our department funding of personnel. With the advent of the engineering program it is vital that we have a long-term solution to our lab support position. We cannot continue to limp along with using an Associate Professor to fulfill the most basic part of the role. Without a person serving in this role, it is difficult/impossible to maintain lab equipment and we have been forced to drop some excellent, but delicate experiments. It is not a good use of resources. The position could potentially be split with the department of Chemistry. This objective aligns with the following strategic plan goals: Department: *Goals 5 & 7*; CAS: *Goals 1.1 & 2.3*; ECE: *Goals 1.B & 2.A*.

A second continuing personnel issue is the Planetarium Director. We would like to restructure his appointment to specifically include teaching a section of PHY 208 (Astronomy) each semester and to make his appointment a full 12-month contract. He is currently on a 10-month contract with 9 being covered by GR funds and the 10th from Planetarium revenue. The final 2-months typically come from either the planetarium revenue or the physics department. This has created a number of problems. First, annual raises cause an increasing portion of the planetarium revenue to go to paying the director and student workers. This has been exacerbated by the state budget difficulties that has caused a drop in the number of school groups that have the resources for field trips. Improvements to the planetarium and special presentations have partially offset this decrease. Second, without sufficient income funds from the planetarium attendance, routine maintenance issues have been either neglected or the costs passed on to the physics department. The increase in pay would actually be less than we currently pay an NTT to cover the PHY 208 for two semesters. This objective aligns with the following strategic plan goals: Department: *Goal 9*; CAS: *Goals 4.1 & 4.2*; ECE: *Goals 4.A & 4.B*

The final personnel issue for UTAs (GAs) for the department. Since the physics department has no graduate students, and therefore no graduate assistantships, the department's Undergraduate Teaching Assistant (UTA) program was established to recruit students with sufficiently good academic records to assist in grading, and, for those with the experience and desire, teaching Gen Ed and introductory physics labs. We also use undergraduate student secretaries for times when the main office staff is out. With the reduced level of support for our Office Manager, we will in all likelihood need additional student support. A little over half of the cost is now supported by our permanent GA funding, but increases in minimum wage have increased the funding gap between what we have and what we need. This is a very successful program and allows the faculty to concentrate on their research rather than spending multiple hour a week in an undergraduate lab. *Strategic Plan Alignment:* Department: *Goals 1, 4, & 7*; CAS: *Goals 1.1 & 1.3*; ECE: *Goal 2.A*

The next group of objectives all deal with the undergraduate experience. The first objective in this section is to upgrade the computers in Moulton 202, our PHY 102 computer lab. There are 21 computers in the room (plus another 12 in the experimental portion of the space), all of which are at least 10 years old. This room is very heavily used throughout the semester, with 600-700 students enrolled in the class. Whereas the computers are still operational, the newer operating systems will no longer work on them and they can become a security risk. A second objective related to the undergraduate experience is updating the equipment for the lower division labs (PHY 105, 108, 109, 110, 111 and 112.) A good portion of the equipment used for teaching our undergraduate labs is older than the students, and much of it is reaching the end of its useful lifetime. The problem is exacerbated by the fact that we have not had a lab support specialist to maintain the lab and demonstration equipment. Students deserve to use equipment that is more representative of current technology. We are requesting both general-purpose equipment that can be used in a number of different labs as well as some specific equipment for particular experiments. A third objective in this category is to enhance the lab experience for our upper division physics majors. Dr. Manna has identified two new experiments that deal with topics that have only recently been measured in the past few years. These experiments will provide the students a sense of modern experimental techniques and prepare them for graduate study in physics. A fourth objective is to improve the equipment used to teach our PTE students in the teaching methods classes.

As the leading institution for physics teacher education in the state (and one of the leading in the nation) it is important to maintain high quality equipment to be used in the teaching methods courses (PHY 209, 302, 310, 311 and 312). It has been many years since we have purchased a significant amount of new equipment for these courses and the attached list will go a long way towards rectify the situation. Finally, we would like to formalize the tutoring that is offered by the Physics Club to students in all 100 level physics courses. Currently, this is done on a volunteer basis by the physics club, but there is no guarantee that a physics major will be available when students have question. Additionally the Visor Center only offers tutoring to a very limited number of students in a very limited number of classes. Our free tutoring reaches a far larger and more diverse group. We would like to obtain sufficient funding to pay tutors to be available four hour a day M-R, so that students are guaranteed help when it is needed. Last year the Physics Club obtained a small grant to fund tutoring for under-represented groups. This seems to have been a successful program and could be an important part of DEI efforts in the department. These objectives align with the following strategic plan goals: Department: *Goals 4, 5 & 7*; CAS: *Goals 1.1 & 2.2*; ECE: *Goal 2.A*

We are also working on a number of projects in curriculum development. Currently at least 50% of our incoming freshmen identify as Engineering-Physics students. With the coming of an engineering program at ISU, we anticipate that we will lose a significant number of our incoming students to engineering. To offset these losses, we are working on developing additional sequences in the physics program. The first of these is Biophysics. Which was approved this spring. We need to begin heavily advertising this sequence. The second is a sequence in Space and Astrophysics. With our recent hire of Dr. Caplan, everything is in place to create a first rate program with courses that are already on the books. Prospective students routinely ask us about the availability of such a program and we are very excited that it should come to pass in the near future. A final consideration is to create a Master's level program in physics. We are one of only two departments in the university that does not offer a Master's degree. Once again, with the advent of the engineering program, this is a good time to consider adding the M.S. degree. It gives the possibility of having graduate assistants for teaching discussion and lab sections for the engineering students. It will also assist the faculty in maintaining a high level of research productivity even with the loss of a portion of the undergraduates. We have submitted a plan to the Provost Office along with a Financial Impact Fund and are awaiting their input.

IV. CAS Specific: Briefly Indicate VERY Tentative SBC Amounts / Plans

Due to the uncertain nature of the upcoming budget situation we have been very conservative in our spending this year. Some items, such as travel and colloquium expenses have not been used nearly as much as in previous years. We have also not yet used a good portion of our SBC funds from last year due to questions about the best way to use them in getting the necessary space for Dr. Biswas. As of now, the department plans to SBC the following amounts

- 1) \$10,000 Grobe/Su CAS contribution to post doc. (It is not clear yet if the candidate will be able to travel to the US this fiscal year.)
- 2) \$50,000 For Facilities upgrades (including MLT 207, 213, 301 and 304)
- 3) \$10,000 for travel
- 4) \$20,000 for undergraduate lab upgrades
- 5) \$58,042 Indirect Cost

We also plan to SBC up to \$80,000 for the solar car team.

Appendix: Funding Requests for FY23

<i>Budget item</i>	<i>Description</i>	<i>Priority</i>	<i>Type</i>	<i>Duration</i>	<i>Amount</i>
Support staff	New staff position for lab/equipment support	1	Other Personnel (A/P, etc.)	Permanent	\$50,000
Fully Fund the Planetarium Director	Fund the Planetarium Director's full salary from general revenue	2	Other Personnel (A/P, etc.)	Permanent	\$14,898
Undergraduate Student Help	UTA and Student Secretary	3	Student Help	Temporary One Year	\$25,554
Computer Lab Recap	Replace computers in PHY 102 lab	4	AEF	Temporary	\$45,344
Recap Lower Division Labs	New equipment for Lower division lab experiments	5	AEF	Temporary	\$53,802
Add Modern Experiments to Upper Division Labs	Purchase the equipment to perform two state of the lab experiments using modern methods	6	AEF	Temporary	\$20,636.
Equipment for Physics Teaching Methods	Purchase new equipment to be used in our teaching methods course for our PTE majors	7	AEF	Temporary	\$4,045
PTE supervision Travel	Student Teaching Supervision Travel	8	Travel	Temporary	\$4,000
Physics Tutoring Center	Hire UTAs to offer tutoring in all lower division physics course	9	PIE	Temporary	\$6240
Total					\$224,610

More details can be supplied on request.