Summarized Assessment Report, 2007
Department of Physics
(B.A., B.S., M.S, Ph.D. CIP Code 40.0801)

Mission, Centrality, Uniqueness

The Department of Physics at Kansas State University has a broad commitment to generate and disseminate knowledge. These roles are interrelated and are complementary to each other. The Department has the responsibility to maintain an active research program in order to contribute to the society through the generation of a better understanding of the physical world and our relationship to that world. Such a research program assures the University a faculty that is intellectually creative and productive and a curriculum that is current.

The Department of Physics is an integral part of the College of Arts and Sciences and forms the core for all natural sciences and technology. The Department provides the undergraduate physics major with the skills he/she needs to contribute effectively in his/her chosen career. In its graduate education program the Department produces a person confident of his/her ability to function as a professional physicist. The Department also provides education for students in scientific, engineering, and other disciplines that require an understanding of both basic physics concepts and applications of physics.

Quality of Faculty

The quality of the teaching by the faculty in physics has been maintained despite large increases in the extramural research funding of the department. Our faculty is engaged in teaching and are continuing to seek ways to make their teaching more effective. Our best researchers are our best teachers. This is because our faculty members are more up-to-date than the texts in the subject and they transmit their excitement about the subject.

hysics faculty have been frequent recipients of local and national awards for quality of teaching. On our faculty we have three recipients of the K-State Presidential Award for Outstanding Undergraduate Teaching, one recipient of the Burlington Northern Teaching Award, and two Coffman Distinguished Teaching Scholars. Eight of our active faculty have been recognized by the College of Arts & Sciences by receiving the Stamey Teaching Award.

Two of our faculty have been honored with the highest teaching award given the United States, the CASE/Carnegie Foundation for Teaching National Professor of the Year Award. One of these awards is given nationwide each year to one professor at a research university. Faculty in all disciplines are eligible. Since this award began in 1981, only three universities – K-State, Rutgers and UC Berkeley – have had more than one recipient. Our Department is the only one in the country in any academic discipline to have two recipients in the same Department.

The best source of information about the relative ranking of physics departments is the National Science Foundation's list of external support for research funding. The list provides data on the amount of support provided from *competitive* Federal funding and from all sources. The funding from competitive Federal sources is particularly useful because these funds are based on peer-reviewed grant application and, thus, represent the high regard in which our peers hold our department.

The most recent data which NSF has released are from 2003. In that survey NSF included 599 institutions which received some federal funding. However, for individual disciplines the NSF tables (http://www.nsf.gov/statistics/nsf05320/tables.htm) list only the top 100 college and universities.

On Federal funding for physics for research Kansas State University ranks 33rd in the nation, first among Regent designated peer institutions and third in the Big 12 behind Texas and Colorado.

While K-State's Department of Physics ranks well by any standards, it is important to notice that NSF does not correct for size of faculty. In the Big 12 both Departments that rank higher than K-State have faculties that are about twice as large as ours

Our faculty members have also been honored by national organizations for the quality of their research. Eight faculty members are Fellows of the American Physical Society and one is a Fellow of the American Association for the Advancement of Science. Members of our faculty have received the top awards in their field from the American Association for Aerosol Research, the AMO Division of the American Physical Society, and the American Association of Physics Teachers. One member has also been recognized with NSF's Director's Award for

Distinguished Teaching Scholarship. These individual honors are the result of a strong research effort throughout our program.

Quality of students

Undergraduate research experience has been instrumental in many of our students winning prestigious national fellowships. Since 2002, three physics majors (Aaron Wech, Jonathan Whitmer, and Eli Parke) and one physics minor (David Thompson) have won the Goldwater scholarship. In addition, Mindy Koehler has won the Clare Booth Luce Scholarship. Also, on average over the last six years, two of our undergraduates are authors of papers published in refereed journals each year. These are statistics to be proud of, and we know that our students take pride in their contributions. The quality of our BS program is also evident in our graduates being accepted in top programs in US.

At present all Ph.D. students must take a core curriculum and pass a standardized written departmental examination. The Ph.D. student will take a minimum of 90 hours of credits of which about 30-40 will be course work during their graduate career. Only after the student passes the standardized departmental exam can the student then take the customized qualifier examination administered by the student's committee and become a candidate for the Ph.D. degree. This selection process is extremely important to maintain the quality of our Ph.D. students. Typically, our students finish their PhD degrees in about a year less than the national average.

Employer Demand

All of our students who seek employment after finishing a degree find an appropriate position. On a broader scale, according to the AIP Statistical Research Center, typically 40% of students with a B.S. in Physics obtain immediate employment, 35% continue graduate studies in Physics, 20% continue graduate studies in other disciplines, and 5% or so are unemployed initially.

AIP also provides data that shows that typically 60% of PhDs in Physics get immediate employment as post-doctoral fellows, 30% get a potentially permanent position, 6% get a temporary position, and about 3% or so are unemployed initially.

According to another survey by AIP namely Initial Employment Surveys of 2003-2005, these are some of the employers in **Kansas** who have recently hired new physics BS recipients: AG Edwards & Sons, Inc., Bird Engineering, Black & Veatch, Cessna Aircraft, Fundamental Technologies, Greenbush, and Via Christi Hospital.

Service to the University and Society at Large

The Department generates annually approximately 5700 student credit hours is service courses which provide a basic introduction to students whose majors are not physics. In addition, physics faculty have made significant contributions to a variety of outreach programs including GROW, EXCITE, Upward bound and QuarkNet.

Physics faculty provide professional service at departmental, college, university, community, state, national, and international levels. Specific activities include service on college and university committees and involvement in faculty governance, manuscript reviews for professional journals, reviews of grant proposals for federal agencies, and leadership in major physics professional organizations, including service on Advisory Committees for the National Academy of Sciences.

Cost Effectiveness

The University provides an annual budget of approximately $3 million dollars for the Department. Most of these funds are used to pay the salaries of the Faulty and some of the support staff. Through external grant support the faculty bring in an additional $6.8 million annually. Thus, the Department's faculty generate in funds coming from outside the state approximately twice the funding provided by the University. This income is the highest per capita grant funding of any administrative unit at KSU.