

Department of Physics

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■ Introduction

The theme of Physics is to understand the fundamental principles of nature, from elementary particles to the massive universe, and to predict phenomena that can be derived from fundamental principles. The goal of the Department of Physics here at KAIST is to instill into students deep physical insights and the ability to use such insights in creative ways through thorough and wide-ranging education in both theoretical and experimental subjects. Presently, the department consists of 28 full-time faculties with additional 16 professors emeritus, about 200 graduate students and 160 undergraduate students. Over 2795 alumni who have graduated from the Department of Physics with a graduate degree have succeeded in playing leading roles in many educational and research institutes as well as in industry. Currently, the demands for well-trained graduates continue to grow.

■ Academic and Research Activities

The research at the Department of Physics at KAIST currently focuses on condensed matter physics, optics, plasma physics, particle physics, and other research areas such as computational physics, biophysics, and nonlinear and nonequilibrium physics. In addition, several research centers are active within the department.

○ Condensed Matter Physics

Physical properties of condensed matters and their application are the subject of both theoretical and experimental researches.

The main research areas include ferroelectrics, superconductors, semiconductors, magnetic and multiferroic materials, soft matters and nonlinear effects, low temperature physics, and theoretical solid state physics.

○ Optics

KAIST, the birthplace of Korean optics community, has been the center of optical researches in Korea. The optics group of KAIST conducts full-scale researches on the theme of light-matter interactions. Its research activities cover a wide range of topics in optics; quantum optics and quantum electronics, laser spectroscopy, classical optics, fiber optics, semiconductor lasers, and high power lasers. Many of these researches are often carried out in the form of dynamic collaboration among academia, national laboratories and industry, by researchers from, different backgrounds working closely together.

○ Plasma Physics

Plasma which consists 99% of the universe, is known as "the fourth state" of matter together with the other three states: solid, liquid, and gas. The plasma group in the Department of Physics studies the characteristics and the possible application of various plasmas.

○ High Energy Physics

The central theme of the high energy physics group is to develop and study the theoretical framework which describes all elementary particles observed in nature and their fundamental interactions, and to obtain a deeper understanding of the fundamental theory of elementary particles.

○ Physics of Complex Systems & Biophysics

Physical Scientists play only a minor role in the study of the life science. The main purpose of biophysical research is to sketch the vast fields of neuroscience and life science from the perspective of a physical scientist and to indicate suitable problem areas for physicists, engineers,

and applied mathematicians, for example, dynamic complexity in neural system, brain function and chaos & control in life system and others.