

## **Brochure „Physics Department Technische Universität München“**

### **Preface**

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Physics: revealing the laws of nature

Physics is the science of natural processes; it forms the basis of all natural sciences. Its roots go back to the earliest Greek philosophers, about 2600 years ago when Thales of Miletus embarked on the discussion about the origin of the world, which he called “physis“, that has continued to the present day. Building on the ideas of earlier physicists, from Aristotle to Newton, the foundations of modern physics were finally laid at the beginning of the twentieth century. Research done on atoms and their component parts revealed how unexpectedly limited our accepted ideas were. These findings lead to a radical review of our basic concepts of such things as matter, space, time, cause and effect. Quantum theory and the theory of relativity established themselves as the pillars of modern physics.

The combination of natural and technological sciences has fundamentally changed our living conditions. All industrial facilities use the findings of physics to steadily improve and renew their production processes and products. Humane working conditions, longer life expectancy, constant supplies of food and energy, world wide mobility and information exchange to mention but a few of the achievements that our societies benefit from today, have their roots in the dramatic discoveries made by natural scientists. However, the influence of modern physics goes far beyond technology. It shapes our thoughts and influences our cultural conditions.

Physics has a long tradition at the Technische Universität Munich. When the TU was founded in 1868 a “physics cabinet“ was also set up. This was done just in time for it to be part of the revolution that was about to start in the field of physics and its conception of the world. Nowadays, the Physics Department has 22 chairs, 16 of which are experimental and 6 theoretical, a total of 38 professors and 12 honorary professors. Research activities cover almost all areas of modern physics ranging from biophysics, nuclear and particle physics to condensed matter physics, which, in turn, is divided into a great variety of disciplines. By adopting the American department system the organizational structure of the Physics Department has been brought into line with the demands of a modern institution. This structure stimulates intensive interaction between the research groups of the department producing synergy effects and optimal communication structures.

The Science Park, the only one of its kind in Europe, on the Garching campus can be viewed as a particularly fortunate circumstance. It started in the mid-fifties with the first neutron reactor, the so-called “Atomei“ of the TUM. Today, various research institutions of national and international importance surround the Physics Department. There are five associated centralized institutes, which interact closely with the department. These are the new neutron source FRM II, the Walter-Schottky-Institute for Fundamental and Applied Research in Semiconductor Physics, the

Accelerator Laboratory of the Ludwig-Maximilian and the Technische Universität München, the Walter-Meißner-Institute for Low Temperature Research of the Bavarian Academy of Sciences and the Bavarian Center of Applied Energy Research (ZAE). In addition, five Max-Planck-Institutes (MPI) are located in the neighborhood, namely the MPI of Extraterrestrial Physics, of Plasma Physics, of Physical Astronomy, of Physics (Werner Heisenberg Institute) and of Quantum Optics. All together an accumulation of high-tech and sophisticated research facilities that broaden the highly ranked physics research in Garching enormously. The Garching campus also houses the chemistry, mechanical engineering, informatics and mathematics faculties. All this constitutes a constellation of competence in natural sciences that, with its modern infrastructure for interdisciplinary research, is unique in Europe.

The Physics Department responds to the challenges of our time by means of groundbreaking research together with intensive teaching and training offered to the coming generation of academics. By appointing young and internationally respected scientists, new research areas of physics complement well-established fields. The department's internationalization has been enhanced by the introduction of international bachelor and master degree programs in "*Engineering Physics*". In addition, the well-established degree programs General Physics and Technical Physics have been supplemented by a course in "*Biophysics*".

The great variety of subjects covered by the Physics Department of the Technische Universität München takes into account the significance of physics as a basic science as well as the current developments and challenges of our time. The Physics Department is thus well positioned to work at the cutting edge of scientific research and to contribute significantly to resolving the key questions of our time.