

II. REPORTS ON RESEARCH



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1 DEPARTMENT OF NUCLEAR REACTIONS

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Overview

In 2002, the Department has been involved in two new experimental programmes. Our colleagues led by Prof. Paweł Żuprański joined a large international collaboration *HERMES* and took part in experiments at DESY devoted to the study of the spin structure of the nucleon. Another group directed by Associate Prof. Bogdan Zwięgliński has worked on a conceptual design of a new generation detector *PANDA* (Proton-Antiproton Detection) which will be used in future experiments at GSI. Moreover, the experimental programmes covering three major domains of our scientific activities: nuclear physics, materials research and atomic physics were continued.

- Nuclear physics

Experimental studies of nuclear reactions induced by heavy ions provided by the Warsaw U-200P Cyclotron were performed in collaboration with scientists from the Institute for Nuclear Studies in Kiev, Ukraine. The aim of the experiments was to investigate isotopic effects in the scattering of ^{11}B from carbon nuclides. Also, excited states of ^6Li predicted theoretically but never seen in experiments were investigated by means of one-neutron transfer reactions.

Proton induced reactions were investigated theoretically by means of the multistep-direct model. Good agreement with the experimental data was achieved.

The mechanism of fragments production in collisions of ^{197}Au with a gold target in the wide range of energies was studied by ALADIN and INDRA Collaborations.

The production of η mesons from proton - proton collisions was investigated experimentally at the Jülich Cooler Synchrotron COSY.

- Atomic physics

The ionisation of Au, Bi, Th and U atoms by Si ions was investigated in collaboration with the Świętokrzyska Academy, Kielce, and the University of Erlangen-Nuernberg.

- Materials research

The sensitivity of the Solid State Nuclear Track PM-355 detectors was tested against intensive gamma and electron radiation. Moreover, using a monoenergetic sulphur ion beam from the Warsaw Cyclotron, the response of the detectors to those ions was investigated.

The ion channelling method was applied to investigate the transformation of the structural defects in InGaAs and InGaAsP layers.

- Education

Lectures on nuclear physics, accelerators, detectors used in nuclear research as well as on nuclear methods used in solid state studies for students from Warsaw High Schools and for students of Warsaw University were given by Dr. Andrzej Korman and Dr. Lech Nowicki. Also, our Department made contributions to the Scientific Picnic and the Science Festival, events organized each year for the general public.