

40 YEARS OF RESEARCH WITH PHOTONS IN DESY

On May 19th, 2004 the *Deutsches Elektronen-Synchrotron* (DESY) in Hamburg (Germany) celebrated the 40th anniversary of the first measurements with the use of synchrotron radiation. I had a pleasure to be one of a few Polish scientists present during this time in HASYLAB and to participate in a special session organized in DESY by the local authorities. In my opinion it is quite a good opportunity to remind all members of PSRS the history of this well-known and very important research center and the development of studies and applications of the synchrotron radiation.

The story started on December 18, 1959, considered as a date of DESY foundation, when a state treaty established *The Stiftung Deutsches Elektronen-Synchrotron DESY* in Hamburg. After a few years of the construction of the first accelerator (at that time - the largest installation of this kind in the world) the first synchrotron radiation beam was generated on February 25, 1964. The first measurements using the synchrotron radiation as a research tool started a few years later, in 1967. In parallel, the particle physics research using the DESY accelerator was also developed. Another accelerator, the electron-positron double ring DORIS was built in Hamburg during the period 1969-1974. Finally, during the period 1975-1978 the 2.3 km of circumference, Positron-Electron Tandem Ring Accelerator PETRA (at that time also the largest storage ring in the world) has been constructed. Many exciting discoveries in the area of particle physics were done at PETRA since 1978.

In 1980 the Hamburg Synchrotron Radiation Laboratory HASYLAB (well known for a lot of us) has been open. At that time an access to 15 experimental stations was offered to the users. Four years later the first Mössbauer spectrum ever to be generated using the synchrotron radiation was recorded at HASYLAB.

In 1992 the development work on TeV-Energy Superconducting Linear Accelerator (TESLA) project started at DESY. It will be a 33-kilometer long superconducting linear accelerator for the collision of electrons and positrons, which should enable high-energy particle physicists to look more deeply and more precisely than ever before into the structure and origin of matter and of the universe. From the very beginning, TESLA was planned as an international project for the future. The final decision of its construction has not been taken until now, but several testing research projects were started at DESY some time ago.

The recent research tool is the European X-Ray Laser Project (XFEL). Due to the favorable decision, taken in February 2003 by the German Federal Ministry of Education and Research, this project is now progressing. Final decision about the construction is expected by the end of this year or at the beginning of 2005, and XFEL should take up operation in 2012.

The new free-electron laser VUV-FEL (which generates soft X-ray radiation in a range down to

wavelength of six nanometers) is the pilot facility for the European X-Ray Laser. VUV-FEL was constructed in TESLA technology. It starts to be commissioning this year, but some test measurements and preliminary research already have been performed using this equipment.

About 250 scientists (mostly from all important German research centers, but also from abroad, including Japan and US) participated in a special session, commemorating 40th anniversary of starting research with the use of synchrotron radiation in DESY.

During the session we had an opportunity to learn about the history of synchrotron radiation generation and development of studies with the use of this radiation in DESY. Some greatest and the most important discoveries made due to this unique light source were also overviewed. More details can be found at the DESY web pages (<http://www.desy.de>).

A part of the session was dedicated to the first Research Director of the center, Professor P. Stählerin, who recently celebrated his 80th anniversary. He was a person who recognized the experimental opportunities offered by a synchrotron radiation and decided to be a supervisor of the first PhD thesis in DESY devoted to this source of new light.

Prof. Stählerin in his commemorative talk overviewed the pioneering work of himself and his team, before measurements with synchrotron radiation finally started at the storage ring of accelerator DESY in 1964.

Today, HASYLAB offers 42 experimental stations plus three test stations at PETRA storage ring for the use of the synchrotron radiation by research groups and industrial facilities from Germany and other countries. Due to several European and German programs supporting the international collaboration, many members of the Polish Synchrotron Radiation Society (including myself) had in the past an opportunity to visit this research center and to perform numerous experiments. Future synchrotron radiation source of the new generation DORIS III is considered to be one of the most powerful sources of radiation in the world, especially in the X-ray region. The new free-electron laser VUV-FEL after several test measurements will take up regular operation in DESY in 2005 (it is possible to apply for a beamtime with the use of this unique facility and to plan future experiments for the next year!).

Finally, I would like to mention about a few Polish accents during this anniversary session.

General Director of European Synchrotron Radiation Facility (ESRF) in Grenoble (France), Prof. W. Stirling, started his talk from an information about our formal participation in ESRF consortium starting from June 1th, 2004 (for some details see p. 1 of this issue).

Another nice Polish accents during the special session was an attention paid by several speakers to the

achievements of the group of Polish specialists (scientists and technicians from a few institutions) headed by our colleague Dr. Jacek Krzywinski from the Institute of Physics of the Polish Academy of Sciences in Warsaw. From the very beginning, Dr. Krzywinski is dealing with VUV-FEL project and is involved in the construction of this exceptional research tool. Together with his coworkers he performed several test measurements as well as research studies with the use of VUV-FEL. I was very proud when the speakers presented some experimental results of Dr. Krzywinski and his colleagues among the principal highlights in Hasylab during the last 25 years.

Let me mention also my personal surprise when one of the most important guests, Senator J. Dräger, in his excellent and full of humor talk mentioned about details of his PhD thesis performed in DESY some time ago. It was really nice to listen a politician who had a lot of his own experience in science. For several times he stressed in his talk the influence of research for the state economy, the development of the country and the future of the society. My personal feeling was that it would be good to have this kind of senators in our parliament.

On behalf of the Executive Committee of Polish Synchrotron Radiation Society, E. Dynowska (a representative of PSRS) presented to J.R. Schneider, Director of HASYLAB, a congratulations letter, signed by the President of PSRS, B. Orłowski (the content of this letter is given below).

Supporting congratulation expressed by B. Orłowski in his letter to J.R. Schneider on behalf of all our community dealing with the synchrotron radiation, we would like to express our great gratitude for many years of fruitful collaboration with DESY and HASYLAB. We also wish our German colleagues many successes in further development of new experimental methods and new techniques with the use of the synchrotron radiation generated by modern sources, as well as numerous new, important scientific results.

Wojciech Szuszkiewicz
Institute of Physics, PAS

Warsaw, 14th of May, 2004

Prof. Dr. Jochen R. Schneider
Director of HASYLAB
Hamburg
Germany

Dear Professor Schneider,

On the occasion of the 40th anniversary of starting research with synchrotron radiation in the world leading Hamburger Synchrotronstrahlungslabor HASYLAB,

on behalf of all members of the Polish Synchrotron Radiation Society,

I would like to heartily congratulate HASYLAB scientists for their pioneering work and establishing milestones in production, conditioning and wide scientific application of synchrotron radiation.

Looking forward next decades, let me wish you further success in opening doors to coherent X-ray laser source and to continue collaborative research with the Polish synchrotron radiation scientific community.

Yours sincerely

Prof. Dr. hab. Bronisław Orłowski
President of PSRS