*euro***mail**

from Gunnar Tibell, Sweden

Accelerator based research at Uppsala University in Sweden celebrates its fiftieth anniversary this year. On 9 December 1949 the Swedish Crown Prince, Gustaf Adolf, inaugurated what was then called the Gustaf Werner Institute for Nuclear Chemistry. He was welcomed on the premises by Professor The Svedberg (The is short for Theodore), Nobel laureate in chemistry and founder of the Institute.

Svedberg's main concern was to produce radioisotopes for medical use, and the original plan was for a cyclotron of about 20 MeV. However, on a study visit to the United States his student Helge Tyrén learned about the invention of the synchro-cyclotron, and the plans were changed. By raising the proton energy of the accelerator to close to 200 MeV they hoped to be able to produce the pi-meson, also called the pion, the particle that had been predicted in the 1930s by the Japanese physicist Hideki Yukawa. Another hope was for medical radiation treatment where the longer range of the ionizing particles at higher energies was essential.

Exactly two years later on 9 December 1951 Ernest O. Lawrence, the inventor of the cyclotron, had the honour of pressing the button to initiate the first beam from the new accelerator. His remark afterwards was short but to the point: "It works." As a curiosity it might be mentioned that the control room was crowded with Nobel laureates. There were not only prize winners of 1951, Sir John D. Cockcroft (physics) and Glenn T. Seaborg (chemistry), but also the above mentioned Lawrence, together with The Svedberg and Arne Tiselius from Uppsala University. The inventor of the synchro-cyclotron, Edwin McMillan, received the Nobel prize in chemistry that year but visited the laboratory later.

A crucial point in the development of the laboratory was the extraction of the proton beam in 1955, giving more flexibility to the arrangement of nuclear physics experiments. This lead to the start of biomedical research at the institute under the leadership of Börje Larsson, later to become Professor of Radiobiology. He was one of the pioneers in the history of radiosurgery as well as in other therapeutic and diagnostic uses of the proton beam at the Gustaf Werner Institute.

A word should be said about Gustaf Werner, the textile magnate from Gothenburg who in 1945 donated the original money for building the laboratory. He was a generous person without interest in formalities. There was an agreement that Professor Svedberg would also try to use the proton beam for studies of synthetic fibres. But this line of research was soon abandoned—it is doubtful it was ever started in earnest.

The original synchro-cyclotron served until 1977. A large number of physics and bio-medical research projects were carried out. Nuclear spectroscopy was always an important part of the research, both off-line and on-line. Among the intermediate-energy physics experiments were the first studies of quasi-free proton-proton reactions and the pioneering studies of pion production on atomic nuclei, so called "sub-threshold" reactions. Both of the main ambitions of Svedberg and his successor Tyrén had been fulfilled: pions had been produced and there was active research in the bio-medical area.

In 1977 the synchro-cyclotron was shut down for a major overhaul to become a sector-focusing cyclotron (the type of cyclotron which can give strong, vertical focusing of the accelerated particle beam). It was reopened in 1986. The energy could be varied in the interval 20 to 190 MeV for protons, and other heavier particles could be accelerated. The old Gustaf Werner Institute ceased to exist and was replaced by the The Svedberg Laboratory. In addition to serving as a beam provider for physics and bio-medical research the cyclotron also became the injector for our CELSIUS storage ring. In CELSIUS the proton energy could be raised to well over 1 GeV which opened up a new field of research to the experimenters.

Today around 300 physicists and medical researchers from Sweden and abroad use the two accelerators of the laboratory. The Program Advisory Committee can only accept part of all proposed experiments. Among them are those performed by two large collaborations, WASA and CHICSi, both of which use the CELSIUS storage ring, operating with light and heavier ions respectively. The storage ring has two target stations, one for a gas jet target and one for pellets of frozen hydrogen or deuterium. Among the other projects, international teams are using a neutron beam for both fundamenal and applied research.

A meeting to celebrate a half-century of accelerator-based research at Uppsala will be held this December. Symposium-like discussions will cover the past and future of the laboratory

EPS activities

This column describes projects, events or sections of the European Physical Society

Forum on Education

The forum was set up in 1993 as part of an education group, the Interdivisional Group on Education—the Group now has three sections, the Forum, EMSPS, and EUPEN. The European Mobility Scheme for Physics Students (EMSPS) is a very extensive student exchange program. The Forum on Education aims to map out the involvement of national physical societies in pre-university physics education. And for the last three years *university* physics education has been studied by the European Physics Education Network (EUPEN), a network of physics departments from all EU countries.

history

The European Physical Society was founded in 1968. The aim was to unite European physicists, thus giving them greater strength in various respects. Research was the main interest of EPS—the Society was divided into divisions, each representing a major physics subfield. But quite early on it was considered important to include questions of physics education, both at schools and universities.

An early statement of the aims of the Forum included the following: focus attention on the importance of a good physics education and its influence on the quality and quantity of future researchers, promote links between the communities of research and education.

current activities

An exchange scheme for physics teachers began in 1997 with two teachers from a Swedish school and two teachers from a British school working in each other's classrooms. Despite the problems of language, there is the possibility of meaningful exchange in Europe. Further exchanges are planned.

Physics competitions for school pupils have been held for many years, the best known being the Physics Olympiad. The Forum is represented at this, and at the smaller International Young Physicists' Tournament, in which teams from different countries compete to find solutions to "open" physics problems.

The Forum now runs a scholarship for teachers which partly covers the cost of going to an international conference on education.

upcoming event

Malvern Seminar on Physics Education
2 to 5 September 1999
Malvern College, United Kingdom
subjects public awareness & physics education
contact J. Lewis *tel* +44 1684 54 07 07

This is an edited version of a talk given by Gunnar Tibell who is, as well as author of the article *left*, Chairman of the Forum on Education