LAUDATIO

Professor Bjørn Wiik is director general of DESY, professor at the University of Hamburg and, what is particularly nice for us, among other honours he has been elected foreign member of the Polish Academy of Sciences. This election recognises his outstanding contributions to science. Such contributions are a necessary, but by far not a sufficient condition for the election. Equally appreciated were his unfailing friendliness and helpfulness to polish physicists and technicians. He is considered a friend of our community. This is the present situation, the latest instalment of a long story. Let me recapitulate briefly the story since its beginning.

Bjørn Wiik was born on February 17-th 1937. This is a very good season of the year to be born for a physicist. Volta was born on the 18-th, Copernicus on the 19-th and Boltzmann on the 20-th. He was born in Bruvik in Norway, attended the Gimnazjum (Gymnas in Norwegian) in Bergen and studied physics, specialising in experimental nuclear physics, in Germany at the Technische Hochschule in Darmstadt. In 1963 he got the Diploma corresponding to our magisterium. From this point on, things went significantly faster. After only two years, in 1965, he got his Ph.D. and the position of a research associate in SLAC. As every particle physicist knows, SLAC is one of the capitals of world particle physics and getting a position there has always been a great success. In SLAC Bjørn Wiik worked on gamma proton and gamma deuteron interaction. Since this was more than 25 years ago, some younger people in the audience may not be aware how interesting and topical this work was. Let me illustrate that by just one fact. Out of the 14 papers signed by Bjørn Wiik in this period, eight were published in the Physical Review Letters. In 1972 Bjørn Wiik returned to Europe. The years 1973-1974 witnessed a revolution in particle physics. The discovery of neutral currents and then of charm paved the way to the general acceptance of what is now called the standard model. Particle physics was not the same any more. The large variety of models produced by variously inspired researchers got replaced by one theory, which could be tested or generalised, but where the basic assumptions were generally respected.

Bjørn Wiik got a position in DESY and has remained there ever since. Only the energy of the colliding particles he studied kept becoming larger and he kept getting more and more responsibilities. He worked first at the accelerator DORIS in the collaboration DASP. This collaboration got many beautiful result, my favourite are those concerning particles containing heavy quarks, but for lack of time I will not discuss them. Next he worked at the accelerator PETRA in the collaboration TASSO. Again a wealth of results was obtained and I will describe very briefly one of them. In the late seventies it was clear that hadrons contained besides the quarks and antiquarks some other stuff. For instance, it was known from deep inelastic scattering that only about half of the momentum of a nucleon was carried by the quarks and antiquarks — the remaining half was carried by the other stuff. It was known that the decays of upsilon mesons were not into quark-antiquark pairs — the other stuff was again important there. Since quantum chromodynamics was the theory of strong interactions, it was usual to identify the other stuff with gluons and to say that there is indirect evidence for the existence of gluons. The problem of observing directly the gluon may seem simple. When an electron and a positron annihilate, they produce a quark antiquark pair, which hadronises into two jets. When the quark or the antiquark emits a gluon, which is sufficiently well separated, this gluon produces a third jet. The observation of this jet is a direct observation of the gluon. Actually the problem is much harder than it looks at first sight. In order to produce three well-separated jets a rather high energy is necessary. According to estimates of Mrs Wu, who put much work into various Monte Carlo simulations, the centre of mass energy of the collision has to be above 22 GeV. Thus, DORIS gave no chance for the direct observation of gluons, while PETRA looked promising. Moreover, even if particles were produced according to phase space, occasionally one would get an event, which looked like a genuine three-jet event. Therefore, one had to find features, which distinguished genuine three-jet events from events just looking like three jet events. Progress was rapid and fascinating. It was established that the transverse momentum of the particles with respect to the axis of the two jets increases with energy. This is exactly what you expect, when an I-shaped pattern goes over into an Y-shaped pattern. Then, it was found that the increase of the transverse momenta is limited to a plane, while the out-of-the-plane components of the transverse momenta do not grow significantly. This again agreed with the expected evolution. After comparing with experiment a number of other implications of quantum chromodynamics, the TASSO collaboration was able to demonstrate in June 1979 that they really see gluon jets. Bjørn Wiik was the first to announce that in public. This happened at the Bergen conference held from the 18-th to the 22-nd of June 1979. About ten days later the same discovery was presented at the Geneva conference by another prominent TASSO member — Paul Söding. Two months later at the Fermilab conference all the four collaborations working at PETRA: TASSO, JADE, MARK II and PLUTO were able to demonstrate that they see gluon jets. But seeing the gluon was not the whole problem. One still had to demonstrate that this is exactly the gluon from quantum chromodynamics. In particular it was necessary to prove that its spin was one. Here again TASSO was the first. The result was published in a classical paper in Physics Letters in 1980. The PLUTO collaboration confirmed this result a month later and the other two collaborations soon followed. There is a postscript to this part of the story. In 1995 Paul Söding, Bjørn Wiik, Günter Wolf, the spokesman of the TASSO collaboration, and Mrs Sau Lan Wu got the prestigious High Energy Physics Prize of the European Physical Society for the first direct observation of the gluon.

Data analysis, especially when interesting results come out, is usually a full time job. It was not so for Bjørn Wiik, however. In his spare time he did much work on accelerator physics. Of course, he knew everything about the electron-positron colliders he was working with, but he became also a leading expert in the much less studied field of electron-proton colliders. His expertise was so much appreciated that in 1981 he was put in charge of the construction of the HERA accelerator — by far the most powerful and the most successful electron-proton collider ever built. I have never worked at DESY, but many of my friends did. They brought me enthusiastic reports on how the construction proceeded. How few engineers were necessary to run this most ambitious and difficult project. How well the relations with the local population were arranged — with little exaggeration they claimed that in the Hamburg region a respectable ecologist is almost embarrassed, if he has not got a piece of accelerator under his house. How efficient was the work and how nice the general atmosphere. This last point is particularly remarkable. When one optimises efficiency, the relations between people are likely to become tense. When a nice atmosphere, where everybody likes everybody, is given priority, efficiency often suffers. It takes a talented leader to achieve both aims simultaneously.

In 1992 HERA was ready. In 1993 Bjørn Wiik became director general of DESY. You should not assume that his many duties prevented him from doing experimental physics. He was one of the proponents of the ZEUS experiment, the biggest experiment at HERA, and became an active member of the corresponding collaboration. What is more, he started a new activity. He has become one of the main driving forces behind the project of a linear collider known now as TESLA. This is likely to lead to the construction of one of the most interesting instruments of particle physics in the early twenty first century. What is even more interesting, TESLA would be used not only by physicists of various specialities, but also by biologists, engineers and others. This is an important novelty in the strategy of getting support for big research projects. I shall stop here, because TESLA is the subject of a separate talk by professor Wiik at this meeting.

Kacper Zalewski