

Nobel 1984

There was general jubilation at CERN following the announcement from Stockholm on 17 October that Carlo Rubbia and Simon van der Meer had been nominated for the 1984 Nobel Prize for physics by the Royal Swedish Academy of Sciences 'for their decisive contributions to the large project which led to the discovery of the field particles W and Z, communicators of the weak interaction'.

These discoveries, made last year at CERN, rank among the greatest achievements in the history of science. They confirmed a new picture of Nature which unifies electromagnetism with the weak nuclear force. This quest began exactly 50 years ago with the first formulation of the theory of the weak force by Enrico Fermi, and ultimately led to the elegant 'electroweak' picture which earned the Nobel award for Sheldon Glashow, Abdus Salam and Steven Weinberg in 1979.

At CERN, the story began in 1968 when Simon van der Meer, inventor of the 'magnetic horn' used in producing neutrino beams, had another brainwave. It was not until four years later that the idea (which van der Meer himself described as 'far-fetched') was demonstrated at the Intersecting Storage Rings. Tests continued at the ISR, but the idea — 'stochastic beam cooling' — remained a curiosity of machine physics.

In the United States, Carlo Rubbia, together with David Cline of Wisconsin and Peter McIntyre, then at Harvard, put forward a bold idea to collide beams of matter and antimatter in existing large machines. At first, the proposal found disfavour, and it was only when Rubbia brought the idea to CERN that he found sympathetic ears.



1984 Nobel laureates Carlo Rubbia (left) and Simon van der Meer acknowledge the cheers.

(Photo CERN 523.10.84)

Stochastic cooling was the key, and experiments soon showed that antimatter beams could be made sufficiently intense for the scheme to work. With unprecedented boldness, CERN, led at the time by Leon Van Hove as Research Director General and the late Sir John Adams as Executive Director General, gave the green light.

At breathtaking speed, the ambi-

tious project became a magnificently executed scheme for colliding beams of protons and anti-protons in the SPS Super Proton Synchrotron, with the collisions monitored by sophisticated large detectors.

The saga — for this is what the story is — was chronicled in the special November 1983 issue of the CERN Courier, with articles describing the development of the

electroweak theory, the accelerator physics which made the project possible, and the big experiments which made the discoveries*.

While it is Rubbia and van der Meer who go to Stockholm to receive the most prestigious scientific accolade of all, the CERN discoveries were only made possible by technological excellence and teamwork unparalleled in the domain of pure research.

This was underlined at a celebration at CERN on 19 October, when the two latest arrivals to the physics hall of fame paid ample tribute to their colleagues and co-workers. There was special mention of the crucial roles played by Leon Van Hove and John Adams during their joint 1976-80 term of office.

Recalling those days, Van Hove described the growing realization that something 'significant' had to be done for CERN. He reviewed

the list of options open back in 1978 — perhaps a superconducting ISR, or an electron-proton collider in the SPS, and then the Antiproton Project. Van Hove admitted that he had never dreamt the choice of the Antiproton Project would turn out to be so successful.

Van Hove paid tribute to the efforts of John Adams in pushing the beam cooling experiments and facing up to the problems of machine building and transformation. At first, some Americans were confident that they could beat CERN, but the European Laboratory had the 'Adams factor' working in its favour, the technical perfection which ensured the SPS performed so well that, as Carlo Rubbia once put it, 'it became apparent that a storage ring was right there ready to be used'.

Summing up, Director General Herwig Schopper ventured that

CERN has now learnt how to make big discoveries and win Nobel Prizes, and it is important that this new skill be passed on to younger generations of physicists.

The physics students of the future will surely read avidly of the deeds of Rubbia and van der Meer at CERN in the same way that previous generations were stimulated by retracing the brilliant insights of Einstein and the subtle craft of Rutherford.

* 'Achievements with Antimatter', available from Publications, CERN, 1211 Geneva 23, Switzerland.



Leon Van Hove, Research Director General at CERN when the decision to go ahead with the Antiproton Project was taken, explains how to pick winners in physics.

(Photo CERN 596.10.84)