Dedication of PETRA at DESY

On 26 April, the electron-positron storage ring PETRA was dedicated at DESY by the President of the Federal Republic of Germany, Walter Scheel, in the presence of the Minister for Science and Technology, Volker Hauff, and senior dignitaries of the State and Science.

PETRA is designed to achieve a peak energy of 19 GeV in each beam, when all 64 RF cavities are installed at the end of this year. At present, with 32 cavities in place, it is operating at 13.7 GeV per beam with a luminosity of 5×10^{29} cm^{-2}s^{-1}.

EPS was represented at the celebrations by its President, Antonino Zichichi who handed to Herwig Schopper, Director of DESY, an EPS Special Scholarship to mark the occasion. The scholarship, which is applicable to any one of the international schools of the "Ettore Majorana" Centre for Scientific Culture, will be awarded to a young physicist at DESY.

Zichichi's Address

After greeting the company in the name of the European physics community, Zichichi went on to express "our great satisfaction at seeing accomplished this important new step (PETRA) at the frontiers of science.

Why is this important ? Because today we live in a peculiar world. If we wish to summarize in few words what mankind has done on this planet since the beginning of his appearance, here is the result: He invented language about 300,000 years ago, and it is thanks to language that we can communicate with each other so efficiently and so synthetically. Think how difficult it would be to express concepts and thoughts via gestures. But language is not enough. Three thousand years ago Man discovered logic. Logic is a set of rules which, once accepted, bind you not to violate them and force you not to contradict yourself. Mathematics is the most rigorous form of logic. But the study of logic does not bind you to Nature. The logic of Nature is science — modern science — Galilean science discovered 350 years ago.

Language, logic and science are the greatest achievements of human intellect. However, the culture of our time is dominated by language. Neither logic nor science are recognized in their role of shaping the future of mankind.

We need more science, more knowledge. Why ? Because if you ask yourself what is the very distinctive feature of mankind, you find that this is science. The science of animal behaviour, ethology, tells us that mankind is similar to other forms of living matter, much more than would have been thought. Man does a lot of things: eats, sleeps, speaks, works, makes love — also war, etc. but in all these acts of daily life he is very similar to many other forms of living matter. Yet, one of his activities is very distinctive, and this is science i.e. the search for, the discovery of, and the understanding of the basic laws of Nature.

If each form of living matter develops itself according to its most distinctive feature, no doubt, everybody one day will be a scientist. Not in the sense that everybody will make fundamental discoveries, but rather that every human being will understand the intrinsic value of studying the fundamental laws of the world in which we live.

Yet in the 3000 years from Archimedes to the present day, the total amount of money that has been invested in pure scientific research is equivalent to 10 or 14 days of the USA gross national product (this figure is at present being investigated by a group of MIT experts).

Just for a moment let us contemplate the fact that every object — the air, the water, a flavour, the food we have eaten today — everything is made of three and only three things: the proton, the neutron, and the electron. Is this not fascinating ? Think now of the proton. Its longevity is measured to be at least 10^{20} times greater than that of the Universe. This means that the longest interval of time conceivable by mankind, i.e. the life of the Universe, is like the time of a single heart-beat for the proton. We are made of particles that are incredibly stable. These are just two examples of the knowledge provided by science to mankind. What remains is even more impressive, despite the very small effort mentioned above.

Subnuclear physics is in the forefront of modern science. The PETRA machine is the newest jewel, and on behalf of the forty thousand physicists of all the countries of Europe — east and west, north and south from the Soviet Union to Portugal, from Finland to Greece — I would like to express our gratitude for all the efforts that have been made here to accomplish this great venture."

Solar Physics Section Workshop

An abridged version of the original summary

In October 1977, the Board of the Solar Physics Section of the EPS invited me to organize in Catania an EPS Workshop on Solar Rotation. This was held in September 1978 at the Catania Astrophysical Observatory, and was attended by 22 participants, observers and theoreticians actively working in the field of solar rotation.

The aim of the Workshop was to obtain a more profound understanding of observations showing that the measurement of different spectral characteristics with origins at different levels in the Sun's outer layers: sunspots photospheric lines, Hα and other chromospheric lines, K-corona features etc., that we group under the generic name of tracers, results in different rotation laws, and we find apparent angular velocities that vary with time. Spectroscopic observations show that photospheric plasma rotates more slowly than the corresponding tracers, while at the chromospheric and coronal levels, the situation is reversed. These measurements show also short and long period variations of angular velocity. Some tracers show a double rotational behaviour, rigid and differential depending on their stage of evolution and on the solar activity cycle. The equatorial velocity does not seem correlated with the strength of differential rotation. The spread of data is larger for spectroscopic measurements which however are supposed to be more accurate than the corresponding tracer measurements.

Why does the plasma show a very different behaviour according to the tracers used to measure its velocity ? Does the large spread of data reflect the physical behaviour of the phenomena, or are the observational techniques affected by random and systematic errors ? Do the tracers really describe the motion of the fluid in which they are immersed ?

It emerged from the Workshop that the long standing discrepancy between tracer and spectroscopic measurements could be considerably reduced by taking into account the