

CERN Courier Archive: 1975

A LOOK BACK TO CERN COURIER VOL. 15, NOVEMBER 1975, COMPILED BY PEGGIE RIMMER

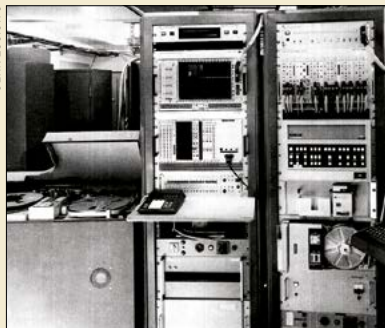
CERN NEWS

Storing data on videotape

One of the problems in high-energy physics experiments is the handling and storage of large volumes of data. It is not unusual for an experiment to need a thousand magnetic tapes. Conventional magnetic tapes can now hold 1600 bits per inch, and tape units are being marketed with improved techniques for writing and reading data at 6250 bits per inch.

For a much more radical improvement, in 1972 C Rubbia initiated a pioneering project to adapt videotape technology for digital data

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collection. This summer, a data handling system incorporating a video recorder has been used at the Intersecting Storage Rings. The IVC MMR-1 recorder is linked to the experiment via a small HP 2100 A computer and CAMAC. Data are written at 10^6 bits

The video tape data recording system recently used by a CERN/Harvard/Munich/Riverside/Northwestern collaboration. The tape unit is on the left alongside the minicomputer and CAMAC electronics.

per square inch at rates of up to 1 Mbyte/s. One reel holds 9 Gigabytes, as much as about 250 conventional 1600 bits per inch tapes, making the need for tape changing very infrequent, once every few days.

The software was written by S Cittolin and the engineering development has been the responsibility of B G Taylor. The system has run for over 2500 hours and is performing well. No other high-energy physics laboratory has yet attacked the on-line data storage problem in this way.

● Compiled from text on pp344–345.

Spotting 3000 new galaxies

The 1 m Schmidt telescope of the European Southern Observatory, ESO, on the La Silla mountain in Chile has photographed an impressive number of new objects in the Southern sky. The analysis of 150 photographic plates, in collaboration with the Uppsala Observatory, has revealed more than 4000 interesting galaxies, including some 3000 which have never been observed before.

Since August, ESO astronomers have been making a spectroscopic study of these objects with the 1.5 m telescope at La Silla. So far, seven galaxies exhibit fairly strong emission lines in their spectrum, and calculated recession velocities attain 48,000 km/s. According to Hubble's empirical law, this corresponds to distances of three thousand million light-years. These observations whet the appetite for the use of the ESO 3.6 m telescope now being built in collaboration with CERN.

On 5 November a new comet was discovered at the ESO Sky Atlas Laboratory at CERN. Named Comet West after its discoverer, R M West, it is anticipated that the comet will pass within 30 million kilometres of the Sun on 26 February 1976. Presently a very faint object in the southern constellation of Sagittarius, it may become visible to the naked eye next year.

● Compiled from text on pp346–347.

Physics Nobel Prize 1975

Before 1949 every physicist knew that the atomic nucleus does not rotate. A quantum-mechanical rotator with moment of inertia J can take up various energy levels with rotational energies proportional to spin and inversely proportional to J . If the nucleus is considered as a rigid body, J is very large and the rotational energies correspondingly very small. Consequently, states of high spin and low excitation energy would exist and isomers would decay rapidly via these states. But isomers exist, so it seemed that the nucleus does not rotate.

In 1950, J Rainwater pointed out, in a brief contribution to *Physical Review*, that the observed large nuclear quadrupole moments could be accounted for by unifying the Mayer–Jensen nuclear shell model and the Niels Bohr liquid drop model into a picture which has since been elaborated



Nobel Prize winners, left to right, A Bohr, B Mottelson and J Rainwater.

considerably by A Bohr and B Mottelson.

Bohr, Mottelson and Rainwater received the 1975 Nobel Prize in Physics for this work. All three have repeatedly opened new doors, Bohr and Mottelson staying mainly in nuclear physics while Rainwater has moved to higher energies.

● Compiled from text on p343.

Compiler's note



Comet West was indeed one of the brightest objects passing through the inner solar system in 1976, bright enough to be observed in full daylight for a few days. Stargazing has bewitched modern human beings ever since we appeared on Earth some 300,000 years ago. Today, a profusion of telescopes invariably steals the show with the kind of glorious images that regularly feature on the *CERN Courier* Astrowatch pages. Thanks to these superb instruments, the observable universe is now thought to contain between 100 and 200 billion galaxies. The oldest one presently known is GN-z11 in the constellation of Ursa Major, found in 2016 by the Hubble Space Telescope. It has an estimated age of about 13.4 billion years, having formed just 400 million years after the Big Bang, when the infant universe had 3% of its present age and distances were about 1/12 their present size.

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WELCOME

CERN Courier – digital edition

Welcome to the digital edition of the November 2018 issue of *CERN Courier*.

Explaining the strong interaction was one of the great challenges facing theoretical physicists in the 1960s. Though the correct solution, quantum chromodynamics, would not turn up until early the next decade, previous attempts had at least two major unintended consequences. One is electroweak theory, elucidated by Steven Weinberg in 1967 when he realised that the massless rho meson of his proposed $SU(2) \times SU(2)$ gauge theory was the photon of electromagnetism. Another, unleashed in July 1968 by Gabriele Veneziano, is string theory. Veneziano, a 26-year-old visitor in the CERN theory division at the time, was trying “hopelessly” to copy the successful model of quantum electrodynamics to the strong force when he came across the idea – via a formula called the Euler beta function – that hadrons could be described in terms of strings. Though not immediately appreciated, his 1968 paper marked the beginning of string theory, which, as Veneziano describes 50 years later, continues to beguile physicists. This issue of *CERN Courier* also explores an equally beguiling idea, quantum computing, in addition to a PET scanner for clinical and fundamental-physics applications, the internationally renowned Beamline for Schools competition, and the growing links between high-power lasers (the subject of the 2018 Nobel Prize in Physics) and particle physics.

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