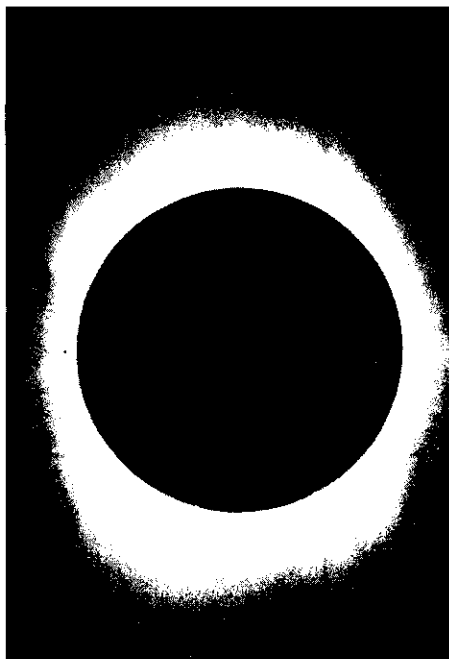


During a solar eclipse, solar neutrinos pass through the Moon but still have 370,000 km before they reach the Earth. If they have mass, they could decay to produce lighter neutrinos and photons, which would show up in the moon's shadow.



their 'flavour' before reaching the earth, where experiments are still expecting electron neutrinos.

The oscillation phenomenon is closely connected to the problem of neutrino mass, and the apparent shortfall in solar neutrinos suggests a link between the masses of the two oscillating neutrinos - the difference between the squared masses of the two neutrinos could be of the order 10^{-5} eV^2 .

The idea of neutrino mass is also interesting to cosmologists looking to explain part of the missing mass of the Universe ('dark matter') as being due to neutrinos with masses of a few electronvolts.

Thus neutrinos with different masses would help solve certain riddles. They also allow new phenomena: for example, one neutrino could decay into a lighter neutrino and a photon. And if neutrinos have a mass of a few electronvolts and the mass relation between the parent and daughter neutrino is the one supported by the

solar shortfall, then the resultant photon should be visible.

The experiment therefore seems simple - detecting light from the sun. The sun sends some 10^{17} photons per sq cm per second, and under normal conditions a few extra would be hard to detect. So an eclipse - when the moon cuts off 8 orders of magnitude of direct sunlight - provides a great opportunity.

Though the moon absorbs photons, it lets through neutrinos, which have another 370,000 km to go before they reach the Earth and have a chance to decay. Any decay signal would consist of additional photons seeming to come from the centre of the Moon, but in fact due to neutrinos generated in the heart of the sun.

The Paraguana Peninsula consists of arid sand and cactus scrub, populated by wild asses and a few rattlesnakes. Against this stark backdrop the eclipse took on a beauty all of its own. For three magic minutes, photos were taken like the one shown. However a CCD telescope picked up no faint light at the centre of the sun's shadow. More refined analysis will allow a limit to be set for the possible disintegration of any neutrinos with mass.

From Francois Vannucci

Francis Perrin (1901-92) was a driving force in the postwar revival of physics research in France. A new book (in French) collects together his major papers.

Bookshelf

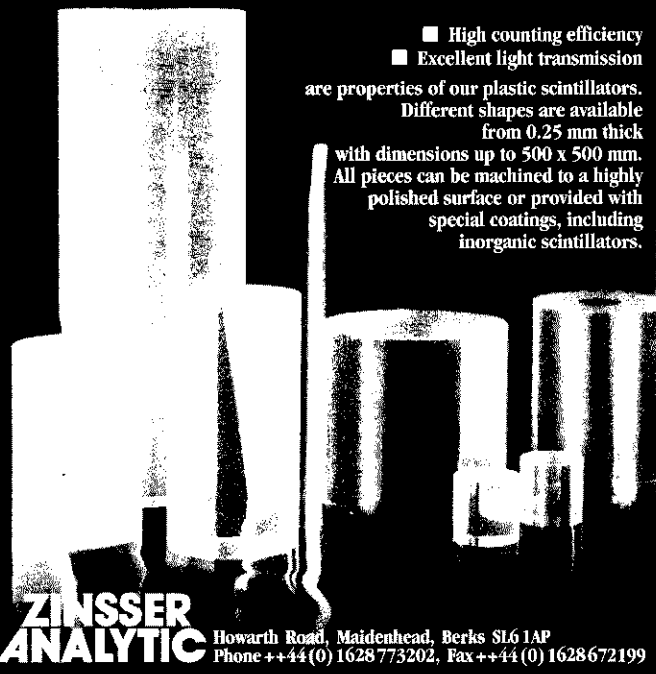
Ecrits de Francis Perrin, rassemblés par Jean Pierre Batou et Monique Neveu, CEA (Commissariat à l'énergie atomique) ISBN 22 7272 0191 5

Francis Perrin (1901-92), son of 1926 Nobel prizewinner Jean Perrin, was a major figurehead in French science over several decades and was very instrumental in building French support for CERN. In an introduction to this 724-page collection of Perrin's scientific work and other papers, High Commissioner for Atomic Energy Robert Dautray underlines Perrin's important role as a founding Commissioner for Atomic Energy from 1946 - 51 and as High Commissioner from 1951 - 70 when the Atomic Energy Commission contributed much to the postwar revival of French physics research.

Reflecting the interests of the man, the book is divided into two main parts - 'the man of science' and 'the public figure'. The former covers mathematical physics, with an



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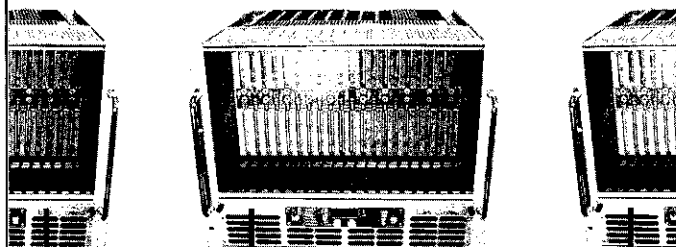
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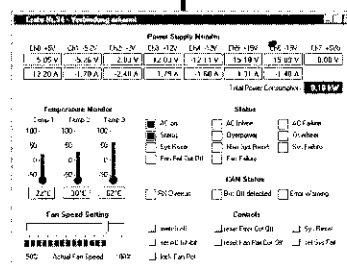
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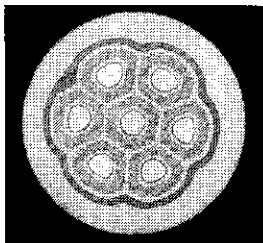
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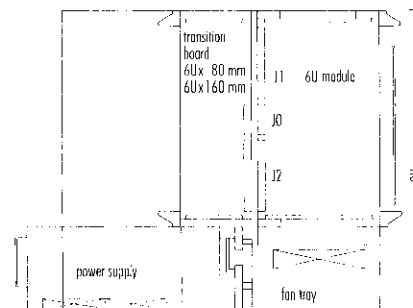
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