

THE SILVER DIRAC MEDAL

The Silver Dirac Medal for the Advancement of Theoretical Physics is awarded by the University of New South Wales on the occasion of the Public Dirac Lecture. The Lecture and the Medal commemorate the visit to the University in 1975 of Professor P.A.M. Dirac, one of the greatest theoretical physicists of the century. Professor Dirac gave five lectures at the University, which were subsequently published as a book *Directions of Physics* (Wiley, 1978 – H. Hora and J. Shepanski, eds.). Professor Dirac kindly donated the royalties from this book to the University for the establishment of the Dirac Lecture series.



PROFESSOR HARALD FRITZSCH

Harald Fritzsch was born and grew up near Zwickau in East Germany. He studied physics at the University of Leipzig, from 1963 until 1968. As a student he was a member of group of students and scientists which opposed the communist government in East Germany. In 1968 he had to escape from East Germany. With a friend he crossed the Black Sea, starting in Varna in Bulgaria. After two days they arrived in Turkey. Soon afterwards Fritzsch was in Munich. Prof. Heisenberg took him as a graduate student at the MPI in Munich. In 1971 he obtained his Ph.D. at the Technical University in Munich.

As a graduate student he started to collaborate with Murray Gell-Mann at Caltech. After becoming professor at the Universities of Wuppertal in Germany and Bern in Switzerland, he obtained in 1980 the Sommerfeld Chair for Physics at the University of Munich.

In 1972 Fritzsch wrote together with Gell-Mann the first paper on the gauge theory of the strong interactions, which they later named Quantum Chromodynamics. He worked since then and still works on this theory and investigated many of its features, such as scaling violations and the spin problem.

In 1975 Fritzsch proposed together with Minkowski the SO(10)-theory of Grand Unification, which today is the outstanding candidate for a unified theory. He wrote many papers on features of the weak interactions. He proposed the so-called Fritzsch matrices for the description of flavor mixing.

Recently he applied these ideas to lepton mixing and neutrino oscillations. He has also worked on the time variation of the fundamental constants.

Fritzsch has written a number of very successful general books on particle physics, cosmology, relativity theory and on fundamental constants. They have been translated into more than 20 languages. He received the Medal for science publishing of the German Physical Society, and is a member of the Berlin-Brandenburg Academy of Science.

Public
DIRAC LECTURE
2008

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PROFESSOR HARALD FRITZSCH
Sommerfeld Professor of Physics,
The University of Munich

WILL SPEAK ON **Tuesday 15th April, 2008**
At 6.30 pm
in the **KEITH BURROWS THEATRE**
at the **UNIVERSITY OF NEW SOUTH WALES**

Title

THE FUNDAMENTAL CONSTANTS IN PHYSICS

ABSTRACT: The fundamental constants in physics are a mystery. Nobody understands their strange values, which we determine in the experiments. In the Standard Model of Particle Physics we are dealing with 28 fundamental constants. I will discuss these constants, which are mostly mass parameters. Astrophysical measurements indicate that the fine structure constant is not a real constant, but depends on time. This would imply that also the masses of atoms change in time. Experiments in Quantum Optics can give information on such a time change.

Refreshments beforehand from 6.15

PREVIOUS DIRAC LECTURES

- 1979 Professor Hannes Alfvén, Nobel Laureate
- 1981 Professor John C. Ward, FRS
- 1983 Professor Nicolaas Bloembergen, Nobel Laureate

- 1985 Professor David Pines, M. Am. Ac. Sc.
- 1987 Professor Robert Hofstadter, Nobel Laureate
- 1988 Professor Klaus von Klitzing, Nobel Laureate
- 1989 Professor Carlo Rubbia, Nobel Laureate
- 1989 Professor Kenneth Wilson, Nobel Laureate
- 1990 Professor Norman F. Ramsay, Nobel Laureate
- 1991 Professor Herbert Hauptmann, Nobel Laureate
- 1992 Professor Wolfgang Paul, Nobel Laureate
- 1996 Professor Edwin Salpeter
- 2002 Professor Heinrich Hora
- 2003 Professor Edward Shuryak
- 2004 Professor Iosef Khriplovich
- 2007 Professor Sir Roger Penrose