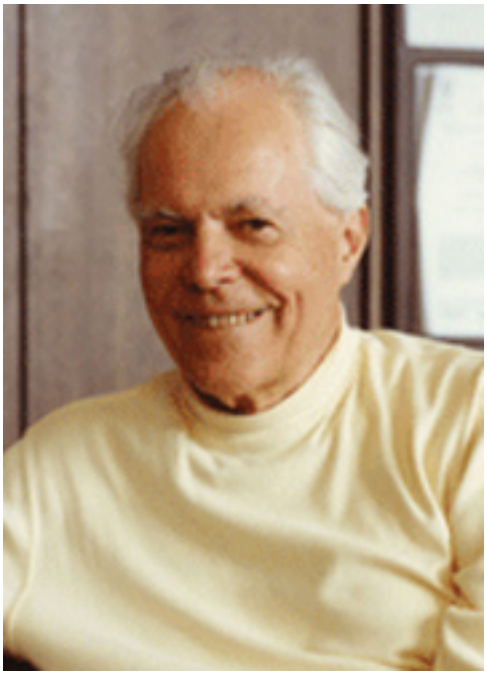
Prof. Rudolf Ludwig Mössbauer
Professor Emeritus, Technical University of Munich, Nobel laureate in Physics, 1961



Most important awards, prizes and academies

Awards: Research Corporation Award, New York, USA (1961); Röntgen-Prize, University of Giessen, FRG (1961); Elliot Cresson Medal, Franklin Institute, USA (1961); Nobel Prize in Physics (1961); Guthrie Medal, Institute of Physics, London, UK (1974); Lomonossov Medal, Soviet Academy of Sciences, Moscow, USSR (1984); Einstein Medal, Einstein Society, Switzerland (1986). *Academies*: German Academy Leopoldina; Pontifical Academy of Sciences; Bavarian Academy of Sciences, FRG; Accademia Nazionale dei XL, Italy; National Academy of Sciences, USA; American Academy of Arts and Sciences; Academy of Sciences, USSR; Indian Academy of Sciences.

Summary of scientific research

Discovery of the phenomenon of recoilless nuclear resonance absorption of gamma radiation (Mössbauer effect) and its direct verification in a Doppler-shift experiment. Application of the method to numerous studies of nuclear hyperfine interactions in efforts to derive various nuclear and solid state properties such as values of nuclear moments and the behavior of magnetic fields

and electric field gradients in solids under different physi-cal or chemical conditions. Development of a new method for the structure analysis of macromolecules based on phase variation techniques. Measurements of the dynamical diffraction of gamma ra-diation under resonant conditions, in particular studies of the frequency and polarization dependence and the anomalous transmission features. Studies of the dynamical behavior of proteins and of their anomalous dependence on temperature. Analysis of the temporal aspects or recoilless resonance ab-sorption of gamma radiation and of related phenomena. More recent research efforts were devoted to the problem of the restmass of the neutrinos. Extensive measurements of neu-trino oscillations at nuclear power reactors have yielded no mixing and no mass values. Measurements with solar neutrinos (Gallex project in the Gran Sasso mountain range in Italy) gave oscillation parameters. The interpretation in terms of neutrino masses is still open. Efforts in Munich (Garching) have yielded cryogenic detectors with unsurpassed resolution in energy.

Main publications

Mössbauer, R.L., 'Kernresonanz-Fluoreszenz von Gamma-Strahlung in 191Ir.',*Z. Phys.*, 151, pp. 124-143 (1958); Mössbauer, R.L., 'Kernresonanzabsorption von Gamma-Strahlung in 191Ir.', *Z. Naturforschung*, 14A, p. 211 (1959); Mössbauer, R.L., 'Recoilless Resonance Absorption and Hyperfine Structure of the 6.3 keV-State in 181Ta' (with Sauer, C. and Matthias, E.), *Phys. Rev. Lett.*, 21, p. 961 (1968); Mössbauer, R.L., 'Structure Analysis of Macromolecules by Means of Anomalous Dispersion Methods', *Die Naturwissenschaften*, 60, pp. 493-500 (1973); Mössbauer, R.L., 'Suppression of Nuclear Inelastic Channels in Nuclear Resonance and Elec-tronic Scattering of γ-quanta for Different Hyperfine Transition in Perfect 57Fe Single Crystals' (with van Bürck, U., Smirnov, G.V., Parak, F. and Semioschkina, N.A.), *J. Phys. C: Solid State Phys.*, 11, pp. 2305-2321 (1978); Mössbauer, R.L., 'A Solution of the Phase Problem in the Structure Determination of Biological Macromolecules in Mössbauer Effect' (with Parak, F. and Hoppe, W.), *The Exotic Side of Method; Topics in Current Physics*, vol. 25, (U. Gonser, ed.), pp. 5-30 (1981); Mössbauer, R.L., 'Gamma Resonance Revisited: Temporal Aspects of Absorption and Scattering', *International Conference on the Application of the Mössbauer Effect 83*, Alma-Ata, 1983, *Applications of the Mössbauer Effect*, (Yuri M. Kagan, I.S. Lyubutin, eds.), Gordon and Breech, 1 (1985), 1; Mössbauer, R.L., 'The Search for Massive Neutrinos', Proc. First ESCO-CERN Symposium on the *Large-Scale Structure of the Universe, Cosmology and Fundamental Physics*, p. 273 (1984); Mössbauer, R.L., 'Neutrino-Ruhemassen und Leptonenzahl-Verletzung', *Phys. Blätter*, 41, p. 391 (1985); Mössbauer, R.L. *et al.*, 'Neutrino Oscillation Experiments at the Gösgen Nuclear Power Plant', *Phys. Rev.*, D34, p. 2621 (1986); Mössbauer, R.L., 'Untersuchung der Protein-Dynamik mittels Mössbauer-Effekt und Röntgen-strukturanalyse' (with Parak, F.), *Physiologie aktuell*, 3, p. 5 (1987); Mössbauer, R.L., 'Quasiparticle Trapping in a Superconductive Detector Exhibiting High Energy and Position Resolution' (with Kraus, H., v. Feilitzsch, F., Jochum, J., Peterreins, Th., Pröbst, F.), *Phys. Lett.*, B 231, p. 195 (1989); Mössbauer, R.L., 'Neutrino Physics at Nuclear Energies', *PINSA*, A64, p. 87 (1998); Mössbauer, R.L., 'Gammastrahlen-Resonanzspektroskopie', *Naturwiss. Rundschau*, 52, p. 171 (1999); Mössbauer, R.L., 'The

Discovery of the Mössbauer Effect', *Hyperfine Interactions*, 126, p. 1 (2000); Mössbauer, R.L., Angloher, G. *et al.*, 'Energy Resolution of 12 eV at 5,9 keV from Al-Superconducting Tunnel Junction Detectors', *J. Applied Physics*, 89, p. 1425 (2001).