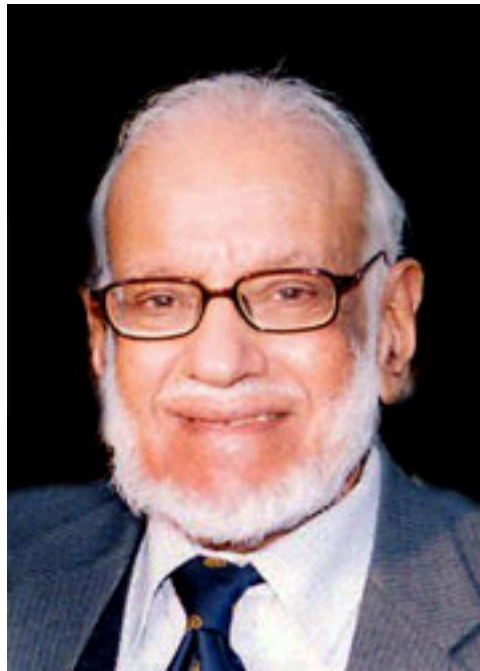




## Prof. Mambillikalathil Govind Kumar Menon President of the National Academy of Sciences, India



### **Most important awards, prizes and academies**

*Awards:* Senior Award, Royal Comm. for the Exhbn. of 1851 (1953-55); Shanti Swarup Bhatnagar Award, Physical Sciences, CSIR (1960); Cecil Powell Medal, European Physical Society (1978); Durga Prasad Khaitan Memorial Medal of the Asiatic Society (1978); Kerala State Cte. for Sci. and Technology Prize (1979); Jawaharlal Nehru Award for Science of M.P. State Govt. (1983); J.C. Bose Fourth Triennial Gold Medal of Bose Institute (1985); C.V. Raman Medal of Indian Nat. Sci. Academy (1985). *Indian Sci. Congress. Assn. awards:* G.P. Chatterjee Award (1984); First Sir Asutosh Mookerjee Gold Medal (1988); Shatabdi Puraskar for overall contributions to the development of Science (1999); Millennium Award for lifetime achievements (2001). *National Awards from the President of India:* Padma Shri (1961); Padma Bhushan (1968); Padma Vibhushan (1985). *Academies:* Fellow, Royal Society; Foreign Honorary Member, American Academy of Arts and Sciences; Foreign Member, USSR Academy of Sciences; Honorary Member, Inst. of Electrical and Electronic Engrs. (IEEE); Honorary Pres., Asia Electronics Union; Fellow and Vice President, Third World Academy of Sciences; Fellow, Indian Nat. Sci. Academy (Pres. 1981-82); Fellow, Indian Academy of Sciences (Pres. 1974-76); Honorary Fellow, National Academy of Science, India; Pontifical Academy of Sciences; Past President of the ICSU (1988-93). For more than two decades, Prof. Menon has been at the highest levels in the Government of India in matters relating to science policy, management and administration.

### Summary of scientific research

Prof. Menon's principal scientific work has been on: 1) The development of nuclear emulsion techniques and their applications to the elucidation of the properties of the strange particles; in particular, establishing for the first time the existence of muons of varying energies, mono-energetic high energy charged pions, and of electrons, as secondaries in the decays of heavy mesons, thereby contributing significantly to establishing the  $K\mu 3$ ,  $K\mu 2$  and  $K\mu 3$  modes of decay; extension of nuclear emulsion work to stacks of very large volume; and the first demonstration of scattering phenomena involving the K-particles, and discussion of this in terms of the 'strangeness' concept which had just then been introduced theoretically. 2) High altitude balloon studies near the geomagnetic equator: for this a dependable high altitude balloon facility was established (and is presently one of the major international facilities used by groups from all over the world with balloons of 10 m. cu. ft. that can carry ton payloads for level flights at 120,000 ft.). This was used initially for studies on the primary cosmic radiation with various electronic detector systems; and now for a range of research on x-rays, gamma rays, particle radiations, atmospheric sciences and the like. 3) Deep underground studies since 1960: Prof. Menon has been connected with the growing programme of deep underground observations on particle intensities, angular distributions and other related phenomena in the Kolar Gold Fields. In these experiments interactions due to natural neutrinos were observed and analyzed for the first time; multiparticle, so-called 'Kolar', events were observed which cannot yet be explained on any known basis, and could represent unknown particle decays or other types of new phenomena; evidence was obtained that muons are essentially produced through decays of pions and kaons even at very high energies and not directly. The later major effort related to a 150-ton detector, and then a 400-ton detector, operated calorimetrically at great depths to search for stability of the nucleon, up to lifetimes of 10<sup>31</sup>-10<sup>32</sup> years, which was the first major experiment operated for this.

### Main publications

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Ramana Murthy, P.V.) (1967); Menon, M.G.K., Studies of Cosmic Ray Neutrino Interactions in the KGF Experiment (with Naranan, S. *et al.*), *Proc. Roy. Soc.*, A301, p. 137 (1967); Menon, M.G.K., The Kolar Gold Field Neutrino Experiment, Pt. I (with Krishnaswamy, M.R. *et al.*), *Proc. Roy. Soc.*, A323, p. 489 (1971); Menon, M.G.K., The Kolar Gold Field Neutrino Experiment, Pt. II (with Krishnaswamy, M.R. *et al.*), *Proc. Roy. Soc.*, A323, p. 511 (1971); Menon, M.G.K. *et al.*, Evidence for the Production of New Particles in Cosmic Ray Experiments Deep Underground, *Pramana*, 2, pp. 59-77 (1975); Menon, M.G.K. *et al.*, Candidate events for Nucleon Decay in the Kolar Gold Field Experiment, *Physics Letters*, 106B, n. 4, p. 339 (1981); Menon, M.G.K. *et al.*, Fully Confined Events indicative of Proton Decay in the Kolar Gold Fields Detector, *Physics Letters*, 115B, n. 4, p. 349 (1982); Menon, M.G.K., Neutrino Backgrounds in the Kolar Gold Field Proton Decay Experiment (with Krishnaswamy, M.R. *et al.*), *Pramana*, 19, p. 552 (1982); Menon, M.G.K., Results on Proton Decay from the Kolar Gold Field Experiments (with Krishnaswamy, M.R. *et al.*), *Pramana*, 5, p. 518 (1983); Menon, M.G.K., Limits on the flux of monopoles from the Kolar Gold Mine Experiments (with Krishnaswamy, M.R. *et al.*), *Physics Letters*, 142B, p. 99 (1984); Menon, M.G.K., Results from the KGF Proton Decay Experiments (with Krishnaswamy, M.R. *et al.*), *Nuovo Cim.*, 9C, p. 167 (1986); Menon, M.G.K. *et al.*, Search for High Energy Neutrinos from SN1987A in KGF Nucleon Decay Experiment, *J. Astrophysics & Astr.*, 11, p. 73 (1990).