



Giampietro Puppi



Bologna, Italy, 20 Nov. 1917 – 25 Dec. 2006

Nomination 17 Apr. 1978

Field Physics

Title Professor at the University of Bologna

Commemoration – Giampietro Puppi was one of the great masters of Italian Physics after the second world war, that had led to the dispersal of the great schools in Rome, Florence and Padua. In Padua he had been a student of Bruno Rossi and Giancarlo Wick. He became Professor of Theoretical Physics in Naples in 1950 and from 1951 in Bologna where he remained, except for short periods in Padua and in Venice, until his retirement in 1989. Puppi will be remembered in the history of physics for his fundamental contribution to the theory of weak interactions. Puppi was the first to recognise that the beta radioactivity theorised by Fermi in 1934, the nuclear capture of muons, and the decay of muons were effects of a single interaction that acts equally in the three processes – the Puppi triangle. Puppi can thus be considered as the founder of weak interaction theory, and his work is a major contribution to the modern unified theories of particle interactions. Giampietro Puppi had a leading role in the launching of modern Italian physics. Turning his interest from theoretical to experimental physics he obtained significant results such as the first proof of parity violation in the decay of strange particles. He had major roles in the birth of Italian radioastronomy, nuclear energy research and space research. He also played a major role in the launching of environmental and earth studies where he realised important collaborations with Italian industry. The list of the many important positions he covered in many European and Italian institutions, that range from the CERN laboratories to the European and Italian space agencies, to the Italian CNR and in many Italian industries, some of which he founded, and of the many honors he received, is too long to recall here. I would however like to remember his unflagging dedication to our Academy where he served for many years as a member of the council, until the very last years of his life, when failing health forced him to retire. His wisdom and generosity will not be forgotten.

Nicola Cabibbo

Most important awards, prizes and academies

Academies: Accademia Nazionale dei Lincei; Accademia Nazionale delle Scienze; Accademia Nazionale di Agricoltura; Académie Internationale d'Astronautique; Accademia delle Scienze di Bologna; Istituto Veneto di Scienze, Lettere e Arti; Pontificia Accademia delle Scienze.

Summary of scientific research

G. Puppi a initié son activité scientifique en 1946, dans le domaine de la physique des rayons cosmiques et en particulier vers l'étude expérimentale, phénoménologique et théorique des différentes composantes dans l'atmosphère et vers l'étude de leurs interactions avec la matière. L'excellente positivité de la composante péne#trante, la diffusion de la composante nucléaire et le bilan énergétique global ont fait l'objet de ses premiers travaux. Dans l'effort de comprendre l'étrange comportement des mésons dans les phénomènes d'absorption par la matière, il est arrivé à formuler l'existence d'une interaction universelle faible, du type proposée par Fermi pour la désintégration beta des noyaux atomiques, pour toutes les particules élémentaires à spin 1/2. Avec son groupe de recherche à Bologne, et souvent aussi grâce à une vaste collaboration avec plusieurs laboratoires de différents pays, il a participé activement au développement de la physique des hautes énergies avec les accélérateurs. Parmi les résultats obtenus à l'aide des émissions nucléaires, il faut signaler: l'étude des déphasages dans la diffusion pion-proton, le caractère résonnant de l'interaction, l'interférence entre interaction coulombienne et interaction nucléaire, la valeur

de la constante de couplage. Dans le domaine des particules étranges, à l'aide des chambres à bulles, une autre série de résultats porte sur les propriétés des hyperons avec la démonstration de la non-conservation de la parité dans la désintégration des hyperons, la détermination de leur vie moyenne, ainsi que de leurs spins. D'autres travaux encore sont dédiés à l'étude des structures complexes produites comme matérialisation d'énergie dans les collisions entre particules à très haute énergie et à la découverte des états résonnants; c'est dans ce travail que l'on arrive à la découverte du méson ρ et à la détermination de son spin et de sa parité. L'activité actuelle de G. Puppi est orientée davantage vers la technologie, l'organisation et la gestion de la recherche dans le milieu industriel. Ses intérêts scientifiques plus récents concernaient les sciences de l'environnement.

Main publications

Puppi, G., 'Sui mesoni dei raggi cosmici', *Nuovo Cimento*, V, p. 6 (1948) and VI, p. 3 (1949); Puppi, G., 'On positive excess of meson component' (in collaboration), *Phys. Rev.*, 76, p. 854 (1949) and *Nuovo Cimento*, VI, p. 6 (1949) and XI, p. 1354 (1953); Puppi, G., 'Sulla componente nucleonica nell'atmosfera' (in collaboration), *Nuovo Cimento*, VIII, p. 12 (1951); Puppi, G., 'Eccitazione dei nuclei per assorbimento dei mesoni 1^0 e 2^0 ' (in collaboration), *Nuovo Cimento*, IX, p. 8 (1952) and X, 1704 (1952); Puppi, G., 'Interaction of (π) mesons in photographic plates 1^0 e 2^0 ' (in collaboration), *Nuovo Cimento*, XI, p. 597 (1954); Puppi, G., 'The energy balance of cosmic radiation', *Progress in cosmic rays* (North Holland, 1955); Puppi, G., 'Coulomb interference in pion-proton scattering' (in collaboration), *Nuovo Cimento*, X, p. 1238 (1955); Puppi, G., 'Results in pion-proton scattering', *Proc. of the fifth Rochester Conf.* (1955); Puppi, G., 'K $^+$ -p scattering', *Proc. of the sixth Rochester Conf.* (1956); Puppi, G., 'Some considerations on the phase-shifts analysis in p $^+$ -p $^+$ scattering' (in collaboration), *Nuovo Cimento*, X, p. 491 (1956); Puppi, G., 'Determination of the pion-nucleon interaction coupling constant from scattering experiments using dispersion relation' (in collaboration), *Nuovo Cimento*, X, p. 172 (1957); Puppi, G., 'Demonstration of parity non-conservation in hyperons decay' (in collaboration), *Phys. Rev.*, 108, p. 1353 (1957); Puppi, G., 'Experimental determination of Λ^0 and Σ^0 spins' (in collaboration), *Nuovo Cimento*, X, p. 222 (1958); Puppi, G., 'Lifetime of Λ^0 , Θ^0 and Σ^0 ' (in collaboration), *Nuovo Cimento*, X, p. 150 (1958); Puppi, G., 'Search for evidence of parity non-conservation in K-He interactions' (in collaboration), *Phys. Rev.*, 120, p. 570 (1960); Puppi, G., 'Helicity of the proton from Σ Decay' (in collaboration), *Phys. Rev. Letters*, 7, p. 264 (1961); Puppi, G., 'Pionic Resonances', *Annual Rev. Nucl. Sciences* (1964); Puppi, G., 'Investigation of resonant $\pi - \pi$ interaction in J = I T = I state' (in collaboration), *Nuovo Cimento* (1962); Puppi, G., 'On the deceleration of metagalactic clouds in the galaxy' (in collaboration), *Nuovo Cimento* (1966).