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## Professor A. N. Mitra (1929–2022)\*

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Late Prof. Asoke Nath Mitra, born on April 15, 1929, was an outstanding theoretical high energy physicist who joined the Department of Physics and Astrophysics, University of Delhi, as a full professor in 1963 when he was only 34 years of age. It is well known even to the undergraduate physics students about the difficulty of obtaining an exact solution to 3-body problem in classical mechanics leave alone the corresponding nontriviality in quantum theory. In quantum mechanics, one has to resort to approximation methods to estimate the atomic ground state energy of a simple system like that of a Helium atom. Prof. Mitra using his mathematical prowess had solved the quantum mechanical 3-body problem exactly for a class of interaction potentials in the early 1960s, paving the way for hectic future research work in the field of few-body nuclear physics.

When it became evident that protons and neutrons are made of three quarks each, Prof. Mitra turned to the 3-quark problem and noted that the electromagnetic form factor for a proton displayed a node that was unphysical. Exhibiting a tremendous insight, he had realized that to circumvent its appearance one needed an additional physical degree of freedom for the quarks. This essentially anticipated the later discovery of colour charges carried by the quarks. In collaboration with M. Ross, he also explained the observed excess rates of heavy meson decay modes ensuing from quark recoil effects. Later on, Prof. Mitra made pioneering contributions to the subject of Quantum Chromodynamics by suggesting the generation of a direct 3-quark interaction term arising due to 3-gluon vertex.

Students of the yore, who had attended his classes in the Department of Physics and Astrophysics, Delhi University, in 1960s and 1970s, describe how effectively and systematically he covered the topics paying attention to subtle details. In the early 2020s, Prof. Mitra had also given a set of lectures on Path integrals in this department for the benefit of M.Sc. and Ph.D. students. As a tribute to the Nobel laureate Late Prof. Bethe, with whom Prof. Mitra had worked at the Cornell University in the early 1950s, he had written an article for the *Resonance* titled 'Hans Bethe, Quantum Mechanics, and the Lamb Shift' (A. N. Mitra, *Resonance*, Vol.10, No.10, pp.33–48, 2005).

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