

An Odyssey of Ashutosh

My son Ashutosh was a quiet person, so the leap of his mind was difficult to gauge at a young age. In school he was always the topper all through. His father thought he has a lot of potential and should take higher education in America. Ashutosh did so well in all entrance exams that he earned a full scholarship even at undergraduate level from an Ivy League university in America. This book is the growth story of Ashutosh from his childhood to his world-wide reputation as a renowned particle physicist. The book brings out succinctly the various facets of his personality. Ashutosh's future vision in particle physics and the challenging aspects of particle physics which is the science of sub-nuclear particles within the atom, has been brought out in the book in simple layman's language. The story from Big Bang and nascent particle formation to the unfathomable Universe has been brought out in the book which makes interesting reading.

Ashutosh received his undergraduate and post-graduate education at the world-renowned University of Pennsylvania, Edinburgh University, and the Wharton School of Business and Harvard University for his doctorate. His post-doctoral work at Columbia University, Fermi National Accelerator Laboratory (Fermilab) in USA and later as Faculty Professor at Duke University has been significant. As a matter of fact his analysis of the W boson particle from the Fermilab experimental data produced the world's best measurements of its mass which helped in predicting the mass of the the Higgs Boson till then unknown. This prediction was borne out by the subsequent discovery of the Higgs particle at the LHC, CERN where he was also a player as Director of the Duke University team of scientists working on LHC. Ashutosh has won several awards for his prestigious work such as Outstanding Junior Investigator, Sloan Fellow (many of whom have gone on to win Nobel prizes), Fellow of the American Association for Advancement of Science (AAAS) and the American Physical Society (APS), the first Leadership Award from Duke University and to crown it all the Fritz London Chair as a Distinguished Professor.

Ashutosh is continuing his research at the cutting edge of discovery science. There are yet several unexplained phenomena like Dark Matter and Quantum Gravity, and Dark Energy which is pushing the Universe further and further apart, which are still not at all understood. Until a few years ago, how and why particles and the visible world acquire solidity and mass was also not clear. The discovery of the Higgs Boson or the "God Particle" as it is commonly called, which was discovered at the Large Hadron Collider (LHC) at CERN in Switzerland, was a huge step forward in understanding the Universe as it exists. The mathematical equations describing the sub-atomic world are called the Standard Model (SM), which has stood its ground for over 50 years now and proved its utility in explaining all sub-atomic observations to date. But this model has its limitations and scientists are now struggling to fix these shortcomings and arrive at a better theory. Ashutosh's research in this direction is path-breaking and would expectedly give a new direction to particle physics. Even the Higgs theory would need to be revisited with Ashutosh's work in mind. Ashutosh has now headed much farther with his new findings which should be getting published in a matter of few months if not weeks. His' is like Columbus's voyage when he went further where no one had gone before and discovered America, as a continent separating Atlantic and Pacific oceans. Ashutosh's work will open up possibilities with renewed interest in probing the Higgs boson further, with a much larger particle collider of circumference 100 km and more as against

27 km for the LHC from which the discovery of the Higgs Boson was made. Ashutosh has already been heading a team of scientists from the world over and a technical feasibility report has been submitted concerning the Future Circular Collider (FCC). CERN and the European Union have accepted the technical requirements of this report and arrived at the need for establishing the FCC in Europe with American and other nations' participation. His work will give impetus to the construction of the International Linear Collider in Japan, whose design has been finalized in collaboration with America and India. Ashutosh's research may also hint at the possible understanding and a theoretical basis for discovery of Dark Matter.

Ashutosh has been pursuing his research into the intricacies of the W boson, which links strongly with the Higgs boson and the top quark, for the last 25 years. The accuracy of his W boson mass measurement is so important that it has ultimately led to an unforeseen breakthrough in the equations of the very stable Standard Model itself.

These are really exciting times and our youth must come forward to take up fundamental science as their chosen career. It deserves mention here that over the last 70 years, of the 161 Nobel prizes awarded in all branches of physics, 49 of them, or 30 percent of the scientists are from the field of particle physics. Readers will find all this and more in Rajhans Publication's book "Putra Whava Aisa".