

Development of Modern Physics

One doesn't see Prof N Mukunda often at NAL ("this is only my second visit here in the last ten years"), and, till last Monday, one had never heard him speak at NAL. But Prof Mukunda made up for his long absence by delivering a superlative National Science Day Lecture on 2 March 1998. "I am delighted that Prof Mukunda is going to speak on the development of modern physics today", Dr T S Prahlaad, Director, said in his opener, "because once in a while aerospace engineers need to be reminded what their roots are". "I don't think I have ever spoken to so many engineers before", Prof Mukunda responded as he looked across at the amply filled Systems Auditorium. What followed was a remarkable narrative about a century of developments in modern physics. Prof Mukunda talked of the "three pillars of physics" (Newtonian mechanics of motion, Maxwell theory of electromagnetism and statistical mechanics as a foundation of thermodynamics), he talked of the 'uneasy partnership and clashes' between the three ("rather like the political equations in India today"), he explained how we end up discovering essentially three extensions of Newtonian mechanics corresponding respectively to rapidly moving, very small and very large objects, he paid a warm and eloquent tribute to the Dirac equation ("wonderful, fantastic, so unexpected and capable of explaining so much"), he talked of the fascinating mathematical structures in quantum mechanics ("so profound and beautiful; one can never tire reflecting about them"). The lecture then went on to survey the structure of matter and addressed the question about how many fundamental particles there really are. Prof Mukunda's exposition was masterly as he recounted his charming tale of quarks, electrons and leptons whose number, "like modern day inflation", continues to grow. "It's a little embarrassing to have such large numbers", the good Professor confessed, adding that "we are still not at the end of our understanding of the nature of matter". The talk then progressed to the forces of nature and the "very beautiful and rich theory" of electro-weak unification and the standard model ("even here we await the last word"). For those in the audience who did not share his complete and unabashed love for physics, Prof Mukunda offered eloquent and stylish prose, endearing humility, wise homilies ("physics can't be like a split personality"), a sincere tribute to experiments ("without experiments there is no impetus to theory") and unbelievable confidence (during the question-answer session Dr Nagabushana began: "do you have any comments on mono...", and Mukunda replied "oh, of course!" even before Nagabushana could complete "...monopoles"; one was reminded of a Sherlock Holmes saying "my blushes" even before Dr Watson could complete his sentence). It was therefore a most remarkable afternoon with Prof N Mukunda. One hopes we don't have to wait for another decade to have the privilege of welcoming this great Indian physicist again at NAL.

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