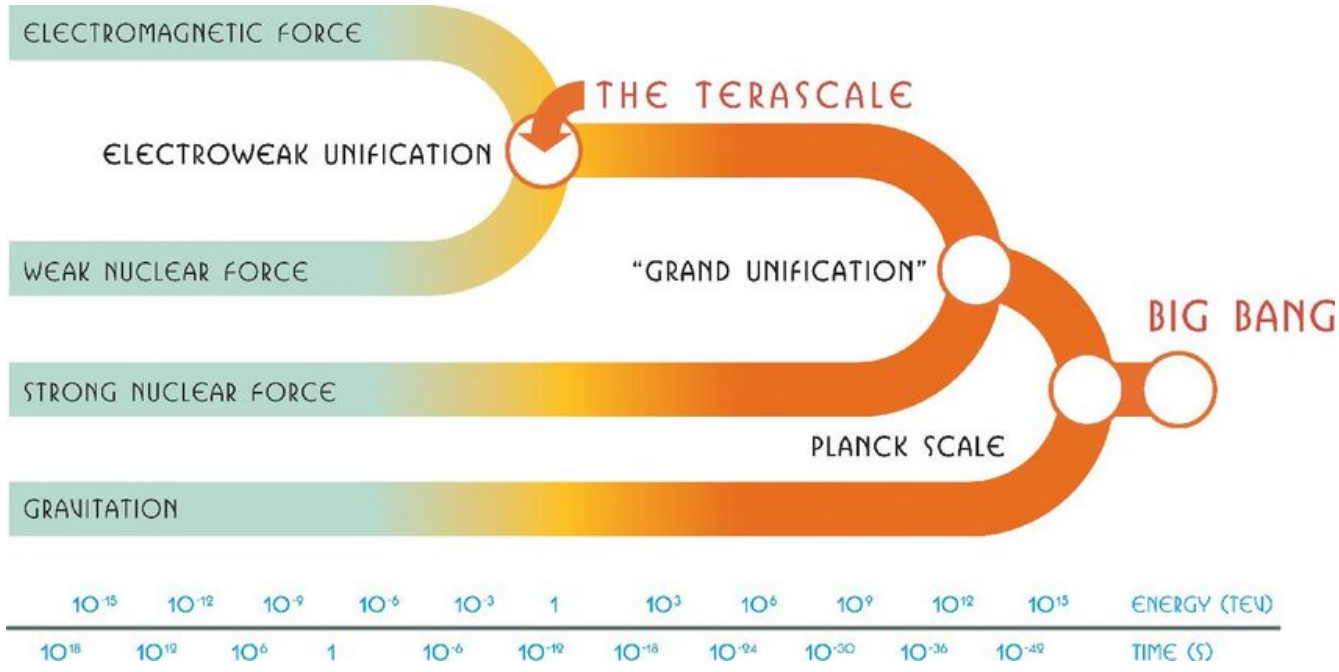
Lecture 39 : The Big and Small (Part-I)
The unification of forces and cosmological phase transitions

It is now clear that the large-scale behaviour of the universe was determined by the conditions that prevailed when the universe was 10-35 seconds old, when a UNIFIED FORCE described all interactions between the elementary particles. So, this lecture is devoted to a review of the microcosm. Among the greatest achievement in physics in the second half of the 20th century was the construction of quantum theories of three of the four forces of nature electromagnetism, weak interaction which mediates radioactivity, strong interaction which binds the nucleus together. Then came the great paradigm shift, inspired by the theory of superconductivity. This led to the unified theories of forces. First the Electro-Weak Theory, and then the Grand Unified Theory of Strong, Weak and Electromagnetism. In this lecture, the ideas underlying the unified theory of forces are explained in simple terms.



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Astronomy & Astrophysics : An Introductory Survey

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A 'Golden Jubilee Celebration' Event of the Astronomical Society of India

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[Supplementary Material : Dr. Sushan Konar]

Resource Material : ***Text Books, Popular / Technical Articles***

1. R. P. Feynman, 1971, **Quantum Electrodynamics**, Westview Press Inc
2. S. Weinberg, 1977, ***The First Three Minutes***, Basic Books
3. C. Itzykson & J. B. Zuber, 1980, ***Quantum Field Theory***, Dover Publications
4. V. B Berestetskii, L. P. Pitaevskii & E. M. Lifshitz, 1982,
   Quantum Electrodynamics : Course of theoretical Physics 4, Butterworth-Heinemann
5. D. R. Tilley, 1990, ***Superfluidity and Superconductivity***, Institute of Physics Publishing
6. S. Weinberg, 1999 (Dec.), ***A Unified Physics by 2050?***, Scientific American
7. J. F. Annett, 2004, **Superconductivity, Superfluids and Condensates**, Oxford University Press
8. D. Boyanovsky, J. J. de Vega, D. J. Schwarz, 2006, Annual Review of Nuclear and Particle Science, **56**, 441
9. D. Griffiths, 2008, **Introduction to Elementary Particles**, Wiley-vch
10. P. B. Pal, 2014, ***An Introductory Course of Particle Physics***, Taylor & Francis

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