Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

Colloquium

What is Wrong with the Metre, The SI Standard of Length?

C S Unnikrishnan

DIAT, Pune

The modern standards of metrology are defined entirely in terms of the fundamental constants of physical nature. The SI unit of length, the Metre, is presently defined by taking the fixed numerical value of the fundamental constant "c", the invariant speed of light in vacuum. This definition has the same physical basis as the pre-2019 definition, as the length of the path travelled by light in vacuum during a time interval of 1/299 792 458 of a (SI) Second, defined in terms atomic frequency standards. I expose the serious flaw in this definition of a supposedly universal standard, arising because of its reliance on Einstein's unverified hypothesis of the propagation of light with an invariant relative speed. I demonstrate the fatal inconsistency in the widely believed hypothesis with an elementary and impeccable proof. The inconsistency makes the accuracy of the SI Metre much worse than its intended relative accuracy of a few parts in a billion, in critical applications. This necessitates a redefinition of the standard Metre, based exclusively on the two-way propagation of light in vacuum, to be compatible and consistent with facts, as well as with the practical methods and protocols related to the implementation of the length standard.

Monday, Oct 21st 2024

11:30 Hrs (Tea / Coffee 11:15 Hrs)

Auditorium, TIFR-H