

SpaceTime: Search for the variation of fine structure constant in space

L. Maleki

Jet Propulsion Laboratory, Pasadena, California, USA.

SpaceTime is a proposed space mission to search for new physics, beyond the Standard Model of particles and fields. The mission will utilize a simple clock instrument that will fly within six solar radii of the sun. The instrument has a high sensitivity to provide new results beyond that achievable with any earthbound experimental probe for a variation of the fine structure constant. In doing so, this instrument will also probe at the limit of the validity of Einstein's equivalence Principle, the grand hypothesis that is the cornerstone of all metric theories of gravity. Since this hypothesis implies that all clocks, irrespective of the details of their construction, are affected universally by nearby matter, a variation of α and its consequent clock related drift will signal the limit of applicability of the Equivalence Principle, and provide the clue that some other new force in nature exists.