

A new era of fine structure constant measurements at high redshift

Friday 9 September 2022 17:00 (10 minutes)

The most promising theoretical models to resolve the H_0 tension also predict temporal or spatial variations of the constants of nature such as the fine structure constant, α . We make use of novel astronomical instrumentation to remove previously dominant systematic effects, thus reaching precision of 1 part per million or better in measuring any departure of the fine structure constant from its terrestrial value. A new advanced tool using Artificial Intelligence algorithms, AI-VPFIT, was developed to aid the analysis. AI-VPFIT provides robust and objective measurements free from human bias and allows us to explore the impact of model non-uniqueness for the first time. I will present our most recent results, including the first constraint on small-scale variations of α . Finally, we put constraints on Bekenstein and quintessence-type dark energy models.

Presenter: Dr MILAKOVIC, Dinko (Institute for Fundamental Physics of the Universe)