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## White dwarfs in Gaia survey to constrain the fine-structure constant

This abstract is primarily based on ApJ 949 (2023) 62. Understanding various physical mechanisms requires an understanding of fundamental constants, however, measurements of these constants are subject to error due to experimental constraints. Researchers have proposed several bounds on fundamental constants based on a variety of experiments and observations. These constraints are different primarily because of the energy scale of the systems used in the studies. We investigate the impact of system temperature and the effect of the underlying theory of gravity on these uncertainties using white dwarfs observed in the Gaia data survey. In my talk, using the structures of these white dwarfs, I will show that variations in temperature as well as the underlying theory of gravity can affect the accuracy of measurements for fundamental constants such as the fine-structure constant and the proton-to-electron mass ratio. This exploration emphasizes the importance of considering the energy of a system when putting bounds on fundamental parameters.

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