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Electron mass variation from dark sector interactions and compatibility with cosmological observations

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We investigate the model where electrons and dark matter interact with dark energy through the rolling of a scalar field which comes from extra dimensional theories such as the braneworld theory and Brans-Dicke theory. In this model dark energy couples to dark matter and electrons which leads to larger values of the mass energies of dark matter and electrons in the early universe. We also fit our model to the cosmological data. By analyzing the data from Planck baryon acoustic oscillation (BAO) light curves (Pantheon) and type-Ia supernovae (SH0ES) it can be seen that the Hubble tension is relieved in our model and the coupling parameter prefers a nonzero value with a significance of over 2 sigma.

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