

We investigate on the direct empirical signals of the modified theories of gravity which are capable of resolving the missing mass problem in galaxies without assuming the presence of the dark matter. We consider AQUAL type modified theories based upon which TeVeS is constructed. This model has a free functional and a critical acceleration.

We suggest measuring the behavior of the gravity at micrometer ranges within the Sun-Jupiter saddle point. Provided that 1. A probe is send to the gravitational saddle point of the Sun-Jupiter system and kept there for sufficient amount of time, 2. Micrometer gravity reaches the sensitivity of measuring gravitational acceleration of $10^{-11}m/s^2$. 3. The Newtons constant can be measured at least with the error bar of 100 percent through analyzing the behavior of gravity at micrometer ranges, we, then, report that measuring the behavior of gravity at micrometer ranges within the gravitational saddle point of the Sun-Jupiter system besides the bounds reported by arXiv:1112.4652 proves/refutes the modified theories of gravity as the resolution of the missing mass problem with a confidence level beyond 10 sigmas.

This proposal adds to the only other suggestion of on this kind: measuring the Pugh-Schiff frame-dragging precession in the Sun-Jupiter saddle point in order to empirically prove or refute the modified theories of gravity (arXiv:1107.2109).