A Conformal Gravity Approach to Universal Centripetal Accelerations of Spiral Galaxies JAMES O'BRIEN, THOMAS CHIARELLI, Wentworth Institute of Technology, PHILIP MANNHEIM, University of Connecticut, Storrs — In a recent article, McGaugh et al. explored the universal nature of centripetal accelerations of spiral galaxies as a new natural law. Their work showed a strong correlation between observed centripetal accelerations and those predicted by luminous matter alone. They explore a fitting function, which can serve to constrain the amount of dark matter in spiral galaxies in a uniform manner, which is completely determined by the baryons. Another possible explanation explored in the paper, is that new physics could be responsible for the close correlation between observation and luminous matter alone. In this work, we show that conformal gravity, a fourth order renormalizable metric theory of gravity, which has enjoyed success in fitting galactic rotation curves can provide a solution to the universal centripetal accelerations observed by McGaugh et al., without the need for any dark matter.

James O'Brien
Wentworth Institute of Technology

Date submitted: 02 Jan 2018   Electronic form version 1.4