The Methodological Value of Coincidences: Further Remarks on Dark Matter and the Astrophysical Warrant for General Relativity

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Abstract

This paper compares four techniques for measuring the masses of galaxies and larger astrophysical systems from their dynamics. The apparent agreement of these techniques is sometimes invoked as reason for hypothesizing the existence of huge quantities of “dark matter” as the best solution to “the dynamical discrepancy”, the 100-fold disparity between the amount of mass visible in large scale astrophysical systems and the amount calculated from dynamics. This paper argues that the agreement, though suggestive, is not definitive. The coincident measurements remain the best reason for preferring dark matter over revisions to General Relativity for solving the dynamical discrepancy, but the resulting warrant for this preference is weak.

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