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The Luminous Convolution Model-The light side of dark matter<sup>1</sup> SOPHIA CISNEROS, Massachusetts Institute of Technology, NOAH OBLATH, JOE FORMAGGIO, MIT, GEORGE GOEDECKE, New Mexico State University, DAVID CHESTER, UCLA, RICHARD OTT, UCDavis, AARON ASHLEY, Massachusetts Institute of Technology, ADRIANNA RODRIGUEZ, MIT — We present a heuristic model for predicting the rotation curves of spiral galaxies. The Luminous Convolution Model (LCM) utilizes Lorentz-type transformations of very small changes in the photon's frequencies from curved space-times to construct a dynamic mass model of galaxies. These frequency changes are derived using the exact solution to the exterior Kerr wave equation, as opposed to a linearized treatment. The LCM Lorentz-type transformations map between the emitter and the receiver rotating galactic frames, and then to the associated flat frames in each galaxy where the photons are emitted and received. This treatment necessarily rests upon estimates of the luminous matter in both the emitter and the receiver galaxies. The LCM is tested on a sample of 22 randomly chosen galaxies, represented in 33 different data sets. LCM fits are compared to the Navarro, Frenk & White (NFW) Dark Matter Model and to the Modified Newtonian Dynamics (MOND) model when possible. The high degree of sensitivity of the LCM to the initial assumption of a luminous mass to light ratios (M/L), of the given galaxy, is demonstrated. We demonstrate that the LCM is successful across a wide range of spiral galaxies for predicting the observed rotation curves.

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