Fluid Mechanics solutions show Dark Matter does not exist in spiral galaxies

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Since the pioneering galaxy rotational velocity measurements of Andromeda (M31) by Vera Rubin and co-workers in 1964, it has been commonly accepted that '**Dark Matter**' or some kind of '**Alternative Gravity**' must exist to explain them. The reason is the azimuthal velocities reach a nearly constant value with increasing distance from the center, instead of falling off with the square root of inverse distance like orbiting planets. Since the Hubble space telescope, the rotational velocities for thousands of galaxies have been measured, almost all of which exhibit similar '*anomalous*' behavior. The amounts of dark matter '*inferred*' by astronmers to calculate the observed profiles is not small (up to $4-5$ times the observable matter), nor is it uniformly distributed but heavily weighted to the outside. All attempts to identify Dark Matter directly (or even postulate a credible source for it) have failed.

By using integral techniques and the averaged continuum equations of fluid mechanics and turbulence, and treating the stars and dust separately, we show these spiral galaxy profiles are NOT ANOMALOUS, but behave EXACTLY as should have been expected. We also show data and pictures from the Triangulum Galaxy (M33), Andromeda (M31), and the Milky Way, all of which are consistent with our solutions. For the Milky Way (for which we have two velocity components) we are able to also compute 'mean streamlines'. These nicely overlay NASA artist reconstructions, and are virtually identical to the log spirals we deduced from an equilibrium similarity analysis of the same equations, strong evidence that galaxies are moving as multiphase fluids.

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