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**Thin-Disk Galactic Rotation Described with Newtonian Dynamics withOUT Mysterious Dark Matter** JAMES Q. FENG, C.F. GALLO, Superconix Inc — We analyze [1-3] galactic rotation data by solving equations based solely on Newtonian dynamics balancing gravitational and centrifugal forces on every point in a rotating axisymmetric thin disk of finite size. For any measured rotation curve, our linear algebra matrix equation resulting from a boundary-element discretization procedure can be used to determine the mass distribution in the disk from the galactic center to the disk edge where the rotation curve ends. There is no need for a speculated rotation curve beyond the "cut-off" radius. For a disk galaxy with a typical flat rotation curve, our computed results show that the surface mass density monotonically decreases from the galactic center toward the periphery, but with a larger decaying scale length than the measured brightness distribution. This fact suggests an increasing mass-to-light ratio with the radial distance, instead of having a constant mass-to-light ratio. In addition to successful reproduction of the rotation velocity curve, our calculated total galactic mass of the Milky Way is in good agreement with the star-count data.

[1] Feng & Gallo, Res Astron Astrophys 11 (2011) 1429-1448.
[2] Gallo & Feng, Astro Soc Pacif Conf Proc, vol 413, p 289-303, Dec 2009.
[3] Gallo & Feng, J Cosmo, Vol 6, 1373-1380, Apr 2010

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