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By Robert Sanders, Media Relations

BERKELEY -- The most prominent of the Milky Way's satellite galaxies -- a pair of galaxies called the Magellanic Clouds -- appears to be interacting with the Milky Way's ghostly dark matter to create a mysterious warp in the galactic disk that has puzzled astronomers for half a century.

The warp, seen most clearly in the thin disk of hydrogen gas permeating the galaxy, extends across the entire 200,000-light year diameter of the Milky Way, with the sun and earth sitting somewhere near the crease. Leo Blitz, professor of astronomy at the University of California, Berkeley, and his colleagues, Evan Levine and Carl Heiles, have charted this warp and analyzed it in detail for the first time, based on a new galactic map of hydrogen gas (HI) emissions.

They found that the atomic gas layer is vibrating like a drum, and that the vibration consists almost entirely of three notes, or modes.

Astronomers previously dismissed the Magellanic Clouds -- comprised of the Large and Small Magellanic Clouds -- as a probable cause of the galactic warp because the galaxies' combined masses are only 2 percent that of the disk. This mass was thought too small to influence a massive disk equivalent to about 200 billion suns during the clouds' 1.5 billion-year orbit of the galaxy.

Nevertheless, theorist Martin D. Weinberg, a professor of astronomy at the University of Massachusetts, Amherst, teamed up with Blitz to create a computer model that takes into account the Milky Way's dark matter, which, though invisible, is 20 times more massive than all visible matter in the galaxy combined. The motion of the clouds through the dark matter creates a wake that enhances their gravitational influence on the disk. When this dark matter is included, the Magellanic Clouds, in their orbit around the Milky Way, very closely reproduce the type