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A secularly evolved model for the Milky Way bar and bulge

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Abstract. Bars are strong drivers of secular evolution in disk galaxies. Bars themselves can evolve secularly through angular momentum transport, producing different boxy/peanut and X-shaped bulges. Our Milky Way is an example of a barred galaxy with a boxy bulge. We present a self-consistent N-body simulation of a barred galaxy which matches remarkably well the structure of the inner Milky Way deduced from star counts. In particular, features taken as signatures of a second "long bar" can be explained by the interaction between the bar and the spiral arms of the galaxy (Martinez-Valpuesta & Gerhard 2011). Furthermore the structural change in the bulge inside $l = 4^\circ$ measured recently from VVV data can be explained by the high-density near-axisymmetric part of the inner boxy bulge (Gerhard & Martinez-Valpuesta 2012). We also compare this model with kinematic data from recent spectroscopic surveys. We use a modified version of the NMAGIC code (de Lorenzi *et al.* 2007) to study the properties of the Milky Way bar, obtaining an upper limit for the pattern speed of ~ 42 km/sec/kpc. See Fig. 1 for a comparison of one of our best models with BRAVA data (Kunder *et al.* 2012).

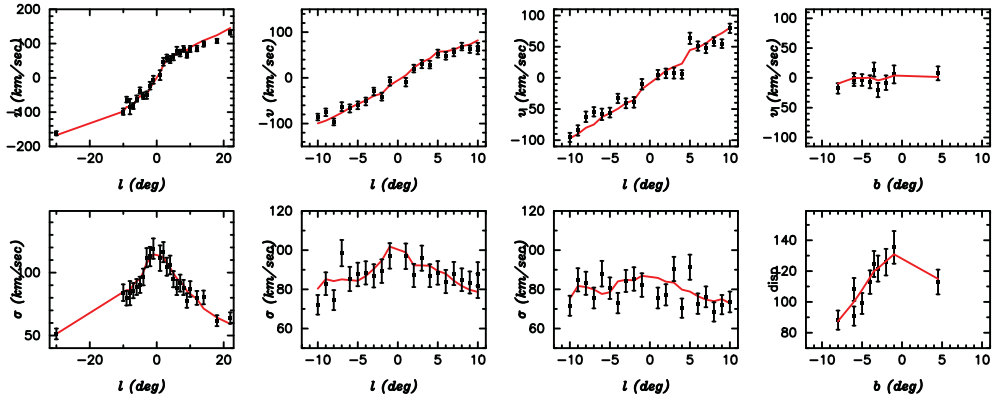

Figure 1. One of our best dynamical models (line) for the galactic bulge-bar of the MW compared to BRAVA data (points). From left to right: mean velocities (top) and velocity dispersions (bottom) in fields at latitudes $b = -4^\circ, -6^\circ, -8^\circ$ with longitude, and along the minor axis with latitude.

References

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