The Milky Way (MW) is a barred galaxy with a boxy bulge representing the inner three-dimensional (3D) part of the bar. We analyzed the MW bulge using an N-body model which formed a boxy bulge from an exponential disk through bar and buckling instabilities. [1] Based on comparisons with star counts in for longitudes $|l| < 26^\circ$, $|b| < 10^\circ$, the so-called “long bar” (e.g., Benjamin et al 2005) and the main Galactic bulge can be understood as the planar and 3D parts of the MW bar, which ends at ~4.5 kpc. [2] The nearly axisymmetric central bulge explains the structural change seen at $|l|<4^\circ$ in recent VVV star counts. No separate nuclear bar is needed. [3] Radial metallicity gradients in the disk survive through the bar and buckling instabilities, possibly explaining part of the vertical metallicity gradients seen in the bulge (e.g., Zoccali et al 2008). – Using NMAGIC dynamical models, we also showed [4] that the cylindrical rotation and velocity dispersions seen in the BRAVA data (Kunder et al. 2012) can be reproduced, arguing for a low pattern speed in of the bar. – All results support a secular origin of the MW bulge, with no clear evidence remaining for a classical bulge.

The N-body simulation is here viewed at time $T\sim1.9$ Gyr when the bar is growing again after formation of the boxy bulge. The bar consists of a planar “long bar” part whose inner 2/3 are thickened as the boxy bulge. In agreement with MW star count data, the inner 600 pc is nearly axisymmetric [2], and the bar shows leading ends from interaction with spiral arms [1].

**Fig.1:** Face-on view of the model with the bar oriented at 25$^\circ$ (top). Edge-on view (bottom) as seen from the Sun at 8 kpc. High density corresponds to bright colors. From [1].

**Fig.2:** Metallicity map $l$(deg) of the model bulge in galactic coordinates. Color corresponds to the average metallicity. From [3].

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<th>Bulge dynamics</th>
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<td>Kinematics of bulge stars from the recent BRAVA and ARGOS (Ness et al 2013) surveys show cylindrical rotation, as predicted by barred bulge models evolved from unstable disks.</td>
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**Fig.3:** Different lines show the models obtained with various bar pattern speeds, overplotted on BRAVA data. Only small differences can be seen, but based on $\chi^2$ the model would prefer a low pattern speed of $\Omega \sim 42$ km sec$^{-1}$ kpc$^{-1}$.

**References:**

I. Martinez-Valpuesta and O. Gerhard