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The σ-bump in elliptical galaxies – a signature of major mergers?

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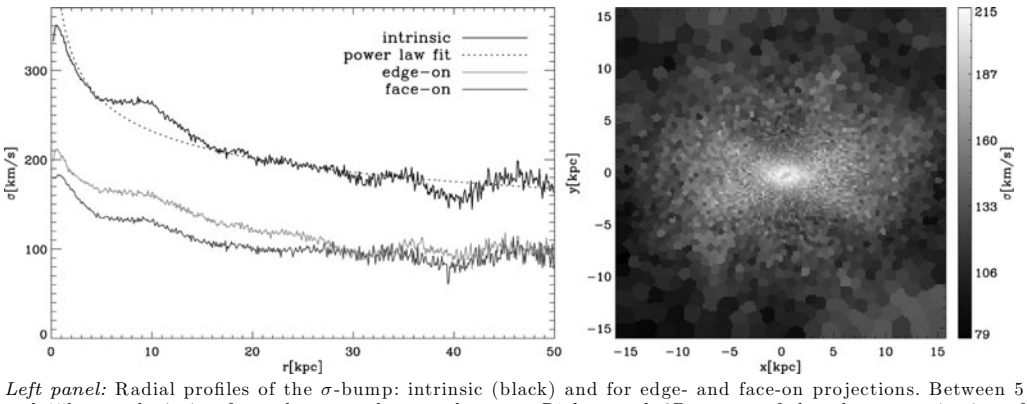
Abstract. The stellar radial velocity dispersion profiles of elliptical galaxies can be well described by a power-law $\sigma(r) \propto r^{-\beta}$. We analyze a set of elliptical galaxies formed by major mergers of isolated disk galaxies with mass ratios of 1:1 and 3:1 for several orbital configurations (Johansson *et al.* 2009). The galaxies in our sample show a deviation from the power-law at $1-3R_{\rm eff}$, which we term the σ-bump (Schauer *et al.* 2014). This feature is most prominent in remnants of 1:1 mergers and weakens for remnants of mergers with smaller mass ratios, indicating that the σ-bump is a signature of an equal mass merger. The σ-bump does not vanish with time but stays constant once it has formed, in contrast to shells. It can be seen under all projections, making it an observable feature in the outskirts of elliptical galaxies. We indeed identify three possible σ-bump candidates in the sample of 12 SLUGGS-survey ellipticals studied by Pota *et al.* (2013), who use globular clusters as tracers for the outer stellar halos (see Schauer *et al.* 2014, for more details). For further comparisons, we here provide for the first time a two dimensional map of the velocity dispersion of one simulated σ-bump galaxy, to identify the σ-bump in observations of kinematic maps out to several $R_{\rm eff}$. The σ-bump appears as a global ring-like feature if seen face-on and as an extended box-like feature in its edge-on projection.

Keywords. galaxies: kinematics and dynamics, structure, elliptical – methods: numerical



Left panel: Radial profiles of the σ-bump: intrinsic (black) and for edge- and face-on projections. Between 5 and 15kpc, a deviation from the power-law can be seen. *Right panel:* 2D-σ-map of the edge-on projection of the same galaxy. The σ-bump appears as a box-like feature. More details will be shown in a forthcoming paper.

References

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