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Bars in a cosmological context

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Abstract. We study the properties of bars in a series of zoom cosmological simulations (Martig *et al.* 2012, Kraljic *et al.* 2012). We find that bars are almost absent from galaxies at $z > 1$, and if they form they tend to be quickly destroyed by mergers and instabilities. On the contrary, at $z < 1$ bars are long-lived, and the fraction of barred galaxies rises steadily. Bars are eventually found in $\sim 80\%$ of $z = 0$ spiral galaxies. This redshift evolution is quantitatively consistent with existing data from the COSMOS survey (Sheth *et al.* 2008), although the detectability of bars is presently limited to $z < 0.8$ because of band-shifting and resolution effects. We predict later bar formation in lower-mass galaxies, also in agreement with existing data (e.g., Sheth *et al.* 2012). We actually find that the characteristic epoch of bar formation is the epoch of massive thin disk formation, corresponding to the transition between an early violent phase at $z > 1$ and a later secular phase. Bar formation thus traces the emergence of the disk-dominated morphology of today's spirals.

Keywords. galaxies: bulges, galaxies: evolution, galaxies: formation, galaxies: spiral, galaxies: structure

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