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Title: “*Spin dynamics of close-in planets exhibiting large TTVs*”

Abstract. We study the spin evolution of close-in planets in compact multi-planetary systems. The rotation period of these planets is often assumed to be synchronous with the orbital period due to tidal dissipation. We show that planet-planet perturbations can drive the spin of these planets into non-synchronous or even chaotic states. In particular, we show that transit timing variations (TTVs) are a very good probe to study the spin dynamics. We apply our model to KOI-227 b and Kepler-88 b, which are both observed undergoing strong TTVs. We also perform numerical simulations of the spin evolution of these two planets. We show that for KOI-227 b non-synchronous rotation is possible, while for Kepler-88 b the rotation can be chaotic.

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