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Title: *"Unveiling Nekhoroshev instability and chaotic diffusion along resonances"*
Abstract. Several types of dynamical systems appearing in Celestial Mechanics can be represented by simple models of chaotic diffusion along resonances. The clarification of the diffusion mechanisms becomes then an important question. In the present work, we will focus on the use of a technique based on normal form computations, that allows to unveil the fastest diffusing chaotic orbits, i.e. orbits undergoing a "Nekhoroshev instability". In particular, we implement a normalization process that completely erases the deformation effects over the orbits' evolution in action space. This, in turn, makes possible to visualize the chaotic diffusion in the separatrix domain of the resonant chaotic layers. Furthermore, we demonstrate that only a few terms in the remainder of the optimal normal form drive the chaotic jumps in action space. Finally, we obtain precise quantitative estimates of the diffusion rate, by implementing a Melnikov-type analysis of the dynamics induced by the above remainder terms.

Joint work with M. Guzzo and C. Efthymiopoulos.