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An experimental investigation on noisy intermittency

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Abstract: Intermittency is a route to chaos when transitions between laminar and chaotic dynamics occur. The main attribute of intermittency is the reinjection mechanism, described by the reinjection probability density (RPD), that maps trajectories of the system from the chaotic region into the laminar one. Results on chaotic intermittency depend on the RPD, that was takes as a constant [1]. Recently, a generalized no uniform RPD has been observed in a wide class of 1D maps, hence the intermittency theory has been generalized, including the classical one as a particular case [2]. Noise has a impact on the intermittency phenomena and the generalized RPD introduces a novel scenario because it is affected by the noise. An analytical approach was introduced to estimate the noisy RPD [3]. In this work, by using the Poincare map, we apply our noisy theory of 1D maps to an experimental continuous system. We found that noisy data provides a description of both, noisy and an ideal noiseless system. We found that the response to the noise of the experimental Poincare map is different than the obtained by numerical simulations. Work supported by the Spanish Ministry of Science and Innovation (ESP2013-41078-R). References. [1] Schuste, H. & Just, W., 2005: Deterministic Chaos. An Introduction (WILEY-VCH Verlag GmbH & Co. KGaA). [2] Elaskar, S. & del Rio E., 2016: New Advances on Chaotic Intermittency and Applications (Springer). [3] del Rio, E., Sanjuán, M.A.F. & Sergio Elaskar, 2012: Commun. Nonlinear Sci. Numer. Simulat. 17 3587-3596.

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