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Predator-prey model for the self-organization of stochastic oscillators in dual populations[1] SARA MORADI, Universit Libre de Bruxelles, 1050 Brussels, Belgium, JOHAN ANDERSON, Department of Earth and Space Sciences, Chalmers University of Technology, SE-412 96 Gteborg, Sweden, OZGUR D. GRCAN, Ecole Polytechnique, CNRS UMR7648, LPP, F-91128, Palaiseau, France — A predator-prey model of dual populations with stochastic oscillators is presented. A linear cross-coupling between the two populations is introduced that follows the coupling between the motions of a Wilberforce pendulum in two dimensions: one in the longitudinal and the other in torsional plain. Within each population a Kuramoto type competition between the phases is assumed. Thus, the synchronization state of the whole system is controlled by these two types of competitions. The results of the numerical simulations show that by adding the linear cross-coupling interactions predator-prey oscillations between the two populations appear which results in self-regulation of the system by a transfer of synchrony between the two populations. The model represents several important features of the dynamical interplay between the drift wave and zonal flow turbulence in magnetically confined plasmas, and a novel interpretation of the coupled dynamics of drift wave-zonal flow turbulence using synchronization of stochastic oscillator is discussed.

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