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Frequency Enhancement in Coupled Noisy Excitable Elements[1] WEI-YIN CHIANG, PIK-YIN LAI, Dept. of Physics and Center for Complex Systems, National Central University, Chungli, Taiwan 320, R.O.C, C.K. CHAN, Institute of Physics, Academia Sinica, Nankang, Taipei, Taiwan 115, R.O.C. — The oscillatory dynamics of coupled noisy excitable FitzHugh-Nagumo elements is investigated as a function of the coupling strength g. For two such coupled elements, it is found that their frequencies are enhanced by the coupling and will synchronize at a frequency higher than the uncoupled frequencies of each element. As g increases, there is an unexpected peak in the mean of frequency distribution before reaching synchronization at the optimal coupling strength. This phenomenon can be understood with a simplified analytic model based on the excitation across a potential barrier whose height is controlled by g as well as the formation of temporary coherent cluster.

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