

# Collective Bursting in Populations of Intrinsically Nonbursting Neurons

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We describe a novel type of bursting that we observe in simulations of large recurrent networks of biophysically plausible, intrinsically non-bursting neurons. The mechanism responsible for the bursting is a combination of excitatory feedback received from neighbouring neurons, together with an activity-dependent adaptation mechanism that slows down spiking. During the bursting phases, the firing patterns are not repeated and the lengths of the interburst intervals are varying. We develop a simple phenomenological model that captures most qualitative aspects of the observed collective bursting. We compare the parameter range leading to bursting in the phenomenological model, with parameter estimates from cortical anatomy and physiology, and conjecture that the discovered new type of bursting should also be observable in biological neocortical networks.

*Key words:* Bursting; Recurrent Excitation; Network Dynamics.