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Qinyu Chao and **Lixia Duan*** (duanlx@ncut.edu.cn), School of Mathematics, North China University of Technology, Beijing, 101300, Peoples Rep of China. *Dynamics analysis of the pre-Botzinger complex under magnetic flow.*

Breathing is a complex rhythmic movement, normal breathing rhythm is substantially uniform, and pathological conditions will appear a variety of changes in respiratory rhythm. Therefore, the dynamics of neuron firing activity has important implications for understanding the reason of morbid respiratory rhythm. With the development of electrophysiological and electromagnetism theory, there are complex distribution of electromagnetic field in the neuronal system. According to the Maxwell electromagnetic induction theorem, internal bioelectricity of nervous system plays a key role for electric activity in each neuron. This talk presents the improved Butera neuron model. The model are created using magnetic flow to describe the influence of electromagnetic induction on neuronal activities. By adding memristive current on the membrane variable, we explore the effects of magnetic flux on the membrane potential. The effects of electromagnetic radiation on the discharge activities are studied. Multiple modes of electric activities can be observed with the fixed initial value by changing the external stimulus currents. Further studies on the relationship between the initial value k_1 and the current are studies by two parameter bifurcation analysis. (Received September 27, 2017)