

## DYNAMICAL PROPERTIES OF DAVYDOV SOLITONS

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### S u m m a r y

A brief review is given on the theory of Davydov solitons, some recent advances of the theory and its perspectives for the modern problems of physics and biophysics. In particular, the main properties of solitons and their dynamics in discrete macromolecular systems are analyzed. It is shown that the soliton model explains well some peculiarities of the experimental data on the saturation of charge carriers mobility with the intensity of the applied electric field in some low-dimensional conducting polymers. Charged solitons are proved to emit millimeter range electromagnetic radiation, via which intra- and inter-cellular signalling is possible. Such radiation is shown to result in the long-range interaction between electrosolitons, which leads to the synchronization of soliton dynamics. This can constitute one of the mechanisms of self-regulation in living systems. Study of the interaction between solitons shows that the Davydov model qualitatively describes the charge transport that accompanies oxidative-phosphorylation redox processes. The input of soliton states into the stimulated luminescence is calculated and shown to describe qualitatively and quantitatively the main properties of the delayed luminescence from biological systems.