

Soliton Structures in a Molecular Chain Model with Saturation

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Abstract In the present work, we study, by means of a one-dimensional lattice model, the collective excitations corresponding to intra molecular ones of a chain like proteins. It is shown that such excitations are described by the nonlinear Schrödinger equation with saturation. The solutions obtained here are the bell solitons, bubbles, kinks and crowdons. Since they belong to different sectors on the parametric space, the bubble condensation could give rise to some important changes of phase in this nonlinear system. Additionally, it is shown that the limiting velocity of the solitons is the velocity of sound waves corresponding to longitudinal vibrations of molecules.

Keywords Solitons · DNA

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