

Chaotic Solitons in Deoxyribonucleic Acid (DNA) Interacting with a Plane Wave

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Abstract: Theoretical analysis of the DNA dynamics reveals that interaction between the single solitons and plane wave implies Smale-horseshoe chaos in the double helices. Solutions of the chaotic solitons are derived from a direct perturbation technique. It is demonstrated that to produce the bounded chaotic solitons, velocities of the solitons must be the same and equal to propagation velocity of the plane wave in DNA. The result shows that the DNA structure may be destroyed by the long action of an electromagnetic wave. It also supplies a useful method for controlling the velocities and unboundedness of the DNA motion in a tumour cell by using a plane wave.

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