

Peierls instability and heteroclinic connections in polyacetylene chains

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Abstract

In this talk the Su-Schrieffer-Heeger model of polyacetylene is considered. This model was first studied rigorously by Kennedy and Lieb, who proved that sufficiently long closed chains with an even number of carbon atoms should be two-periodic at zero temperature, as predicted by Peierls. After recalling this result, I will consider closed chains with an odd number of atoms: when this odd number goes to infinity, the ground state converges to a heteroclinic connection between two-periodic configurations. Then, coming back to the case of an even number of atoms, I will consider positive temperatures and will give a rigorous description of a phase transition between two-periodic and one-periodic states when the temperature attains a critical value. This talk is based on joint works with Mauricio Garcia Arroyo, David Gontier and Adechola Kouande.