Nonlinear Energy and Charge Transport in Silicates. Experiments and semiclassical models.

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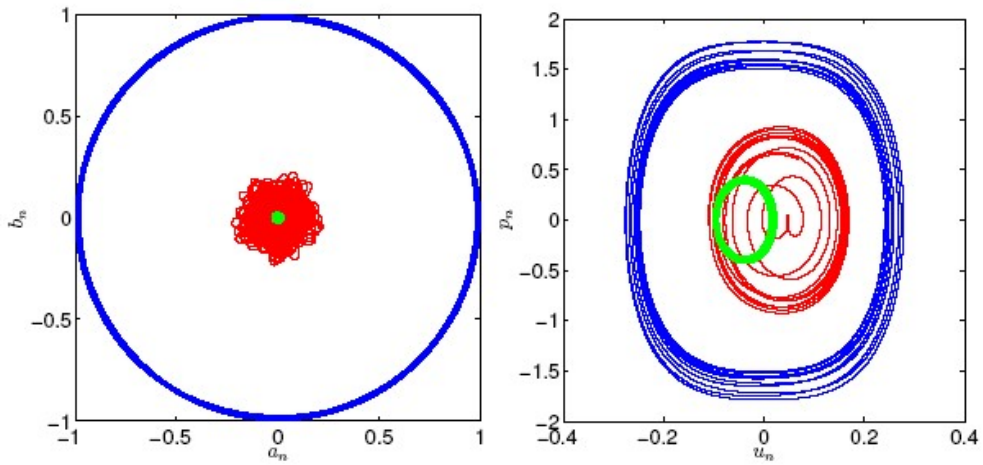
Hyperconductivity is the phenomenon of charge transport in absence of an electric field. The enery and momentum is provided by the impact of swift particles or ion recoil after radioactive decay. Charge transport is mediated by solitary waves that bind to an electric charge. An analogy is a surfer riding a large wave without the need of wind or motor propulsion, the energy provided by the wave.

Experiments on hyperconductivity have stimulated the study of exact solutions in Klein-Gordon systems in the form of travelling solitary waves through the spectral theory in the moving frame. Those systems can allow for the description of charge transport by constructing a related semiclassical tight-binding system. For approximate phenomenological models, both exact breathers and polarobreathers are found, but for more realistic physical model and parameters, there appear serious difficulties. However, solutions of interest as chaobreathers can be found and the research continues.

References



Phase space of the real and imaginary part of the charge amplitude and the position and momentum lattice variables.

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