

Non-linear Schrödinger equation, helicity and strings with applications to proteins

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Summary

We argue that the Landau free energy of a three dimensional string-like object coincides with the Hamiltonian of non-linear Schrödinger equation (NLSE), with an additional helicity contribution. The solitons of the NLSE have a geometric correspondence with loop-like structures that interpolate between helical structures. As an application we show that proteins in their native state can be modelled in terms of multi-soliton solutions of the NLSE, with atomic level precision. Background material for the presentation can be found at Les Houches 2014 lectures

<http://arxiv.org/pdf/1412.8321.pdf>