



On asymptotic stability of moving ground states of the nonlinear Schrodinger equation

Scipio Cuccagna

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We extend to the case of moving solitons, the result on asymptotic stability of ground states of the NLS with a short range linear potential obtained by the author in a previous paper. Now we drop the potential and allow moving solitons. For technical reasons we consider only smooth solutions. The proof is similar to the earlier paper. However now the flows required for the Darboux Theorem and the Birkhoff normal forms, instead of falling within the framework of standard theory of ODE's, are related to quasilinear hyperbolic symmetric systems. So there is an issue about well posedness and regularity with respect of the initial data of the flows. It is also not obvious that Darboux Theorem can be applied, since we need to compare two symplectic forms in a neighborhood of the ground states not in in energy space, but rather in a smaller space where also the variance is bounded. Then the validity of Darboux Theorem is not obvious because, since the NLS does not preserve small neighborhoods of the ground states in this smaller space, we are comparing the to symplectic forms in a set which, in some respects, is large.

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