

Spacetime estimates and scattering theory for quasilinear Schrodinger equations in arbitrary space dimension

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Abstract

In this paper, we consider Cauchy problem of a quasilinear Schrodinger equation which has general form containing potential term, power type nonlinearity and Hartree type nonlinearity. The space dimension is arbitrary, that is, it is larger than or equals to one. First, we establish the local wellposedness of the solution and discuss the condition on the global existence of the solution. Next, we establish some conservation laws such as mass conservation law, energy conservation law, pseudoconformal conservation law of the solution. Based on these conservation laws, we give Morawetz type estimates, spacetime bounds for the global solution. Last, we take two ideas to establish scattering theory for the global solution in different functional spaces. The first idea is that we take different admissible pairs in Strichartz estimates for different terms on the right side of Duhamel's formula in order to keep each term independent, another one is that we factitiously let a continuous function be the sum of two piecewise functions and choose different admissible pairs in Strichartz estimates for the terms containing these functions.

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