Karlsruhe Institute of Technology

Seminar of the Work Group
Nonlinear Partial Differential Equations
WS 22/23

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Seminar room: SR 3.068

The Madelung Equations: Interpretations and Well-posedness

Robert Wegner, KIT

Abstract

Under the Madelung transform $q \mapsto (|q|^2, Im(\frac{\partial_x q}{q}))$ the Schrödinger equation transforms into a system of "quantum" Euler Equations, often called the "Madelung equations". This hydrodynamic formulation has historically been an inspiration to physicists searching for a more classical approach to quantum mechanics. We sketch some of these ideas and investigate how a well-posedness result for NLS can be transferred to the Madelung equations.