
MATHIEU LEWIN, CNRS & University of Paris-Dauphine

The Uniform Electron Gas and Density Functional Theory

In this talk I will present recent results obtained with Elliott H. Lieb (Princeton) and Robert Seiringer (Vienna), concerning the Uniform Electron Gas (UEG) and its role in the Local Density Approximation of Density Functional Theory. The UEG is a gas of infinitely many electrons whose density is assumed to be constant everywhere in space. It is defined differently from Jellium, which has a positive constant background but no specific constraint on the density. After constructing the UEG using classical tools from statistical mechanics (thermodynamic limit), I will show how it arises in Density Functional Theory in the limit of a slowly varying density, when minimizing the Levy-Lieb energy functional.