

**Regularity of solutions for the Coulomb multi-particle
Schrödinger equation, and the one-particle density matrix**

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Regularity properties for multi-particle systems have been the focus of mathematical research since 1950's. Such results determine spectral properties of the one-particle density matrix which is the key object in the quantum-mechanical approximation schemes. In this talk I will give a short survey of recent regularity results with emphasis on sharp bounds for the eigenfunctions, and show how these bounds lead to the asymptotic formula for the eigenvalues of the one-particle density matrix.