NON-LINEAR SCHRÖDINGER EQUATION WITH SINGULAR POTENTIALS: NEW RESULTS AND OPEN PROBLEMS

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A central topic in mathematical physics is the rigorous investigation of many body quantum systems subject to very short range interactions. The dynamics of such systems can be efficiently described by non-linear Schrödinger equations with singular potentials. In this talk, I will discuss a recent result on the well-posedness of the Hartree equation with a point interaction in $\mathbb{R}^3$, in a suitable class of singular Sobolev spaces. I will also discuss various open problems.

Based on joint works with G. Dell'Antonio, V. Georgiev, F. Iandoli, A. Michelangeli, A. Olgiati, and K.Yajima.