

In this talk, I will discuss the existence of solutions for a class of modified quasi-linear Schrödinger-Choquard equations involving singular weights in \mathbb{R}^N , where $N \geq 2$. In particular, we consider the main operator of the form

$$(-\Delta)_N u - u(-\Delta)_N u^2, \quad N \geq 2,$$

and a nonlinearity of critical exponential growth (in the sense of the Trudinger-Moser inequality), convoluted with the singular weighted Riesz potential, known as the Stein-Weiss type convolution.

I will focus on how to address the difficulties posed by such operators, which prevent the natural energy functional from being well-defined in the variational framework. Additionally, I will discuss how the challenges arising from various potential functions and the nonlinearity with critical growth, which induce non-compactness in the Sobolev embeddings, are overcome to establish the existence of solutions.

This is joint work with S. Goyal (NSUT, India) and K. Sreenadh (IIT Delhi, India). (IIT Delhi, India).