Critical $N-$Laplacian Stein-Weiss system in $\mathbb{R}^N$: Existence of solutions, asymptotic behavior, uniform estimates and regularity

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In this talk, we present a class of Stein-Weiss coupled system in dimension $N \geq 2$ involving Δ_N- operator, where $\Delta_N u = \mathrm{div}(|\nabla u|^{N-2}\nabla u)$ is the N-Laplacian operator. We discuss both linear and nonlinear coupling cases. Assuming that the nonlinearities have critical exponential growth in the sense of Trudinger-Moser inequality, we study the existence of positive solutions for the coupled system. Moreover, uniform estimates, asymptotic behavior and regularity of the solutions enrich the study of the system. In our approach we introduce an alternative to the standard arguments based on Lions' vanishing-nonvanishing and shifted sequences argument by utilizing a variant of Palais Principle of symmetric criticality.