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Paradigms and Scenarios for the Dark Matter

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The deeper we go into the knowledge of the dark component that embeds the stellar component of galaxies, the more we realize the profound interconnection which is present between the two of them. The scaling laws among the structural properties of the dark and luminous matter in disc systems are too complex to be arisen by two inert components that just share the same gravitational field. This brings us to critically focus on the 30 years old paradigm, that, resting on a priori knowledge of the nature of dark matter (DM), has led us to a restricted number of scenarios for dark matter. The galaxies's structural properties show strong indications that the dark and luminous components have interacted in a direct way over the Hubble time. We propose to break the dark matter mystery by taking a step back and start following a new paradigm: the Nature of dark matter can be guessed/derived only from deep analyzing the properties of the dark and luminous mass distribution at galactic scales. As first result in Spirals, the quantity $\rho_{DM}(r, L, R_D)\rho_*(r, L, R_D)$, the (macroscopic) kernel of a dark-to-luminous interaction, shows specific properties that call for a collisional nature of the dark particle.

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