

## Opinion

# Further Evidence for the Cantor Dust Composition of Dark Matter

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## Abstract

Recent experiments continue to falsify the hypothesis that Dark Matter (DM) consists of quantum-like particles resembling the content of the Standard Model (SM). Several arguments also exist against theories advocating that DM follows from various modifications or thermodynamic analogs of General Relativity (GR). These findings indirectly favor earlier interpretations of DM as Cantor Dust, an outcome of the minimal fractal structure of spacetime near or above the electroweak scale. Cantor Dust is consistent with the idea of *Unmatter*, an exotic phase containing fractional numbers of quanta per state, mixing particles and their antiparticles and carrying arbitrary non-integer spins.

**Keywords:** Standard Model, Dark Matter, Cantor Dust, *Unmatter*, minimal fractal manifold.

Observations accumulated to-date indicate that DM does not consist of quantum-like particles resembling in any way the primary constituents of the SM (leptons, quarks, gauge bosons or the Higgs scalar). Several on-going searches report either inconclusive evidence or the absence of axions, WIMP's, sterile neutrinos, dark photons, neutralinos, fuzzy DM, strongly interacting massive particles (SIMPS) and other beyond the Standard Model (BSM) particles associated with DM. Objections have also been raised against theories arguing that DM follows from modifications or thermodynamic interpretations of GR, or from the abundance of primordial black holes in the early Universe. By default, these results strengthen the proposal that DM amounts to *Cantor Dust*, a dimensional condensate created by the minimal fractal structure of spacetime near or above the electroweak scale of  $M_{EW} = 250 \text{ GeV}$  [1-2, 6-9]. A fundamental property of Cantor Dust is that it behaves like an extended superfluid phase that can be built outside the axion paradigm [1]. The onset of this phase reinforces the idea that SM is a self-contained multifractal set near  $M_{EW}$ , with its gauge and flavor content tightly constrained [2-3, 6-7].

By the same token, "*Unmatter*" represents an exotic state which drastically deviates from the attributes of baryonic matter. It reflects a continuous spectrum of neutralities between particles and antiparticles and between gauge bosons and fermions. It is likely built from fractional numbers of quantum states and arbitrary mixtures of integer and half-integer spins [4-5].

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