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Dark Energy and Dark Matter: two faces of the same problem?

MIHAI BONDARESCU, University of Mississippi, Oxford, MS, JAYASHREE BALAKRISHNA, Harris Stowe State University, St. Louis, MS, RUXANDRA BONDARESCU, Pennsylvania State University, University Park, PA — We discuss the possibility that a family of very light scalar particles is behind both Dark Matter and Dark Energy. When the mass is chosen appropriately, agglomerations of such particles would naturally exhibit no small-scale structure and would be supported against gravitational collapse by the Heisenberg uncertainty principle alone, very much like the previously studied Boson Stars. In the early Universe, when the cosmological horizon was smaller than the characteristic size of one of these particles, the presence of such a scalar field would accelerate inflation in a manner similar to the way Dark Energy accelerates the expansion of the universe today. At least two particles of different masses would be necessary to explain the effects attributed to both dark energy and dark matter. If such a particle were to exist, the existence of a second similar object is more likely. This work is in progress.

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