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Planck Mass Rotons and the Cosmological Constant Problem
FRIEDWARDT WINTERBERG, University of Nevada, Reno — The dark energy and small positive cosmological constant is the greatest unsolved mystery of elementary particle physics. The solution offered by string theory that there are 10^{500} possible universes suggests that string theory is an incorrect model to describe physical reality. The alternative Planck mass plasma model assumes that the vacuum is densely filled with an equal number of positive and negative Planck mass particles interacting locally over a Planck length by the Planck force, with Lorentz invariance to result from the longitudinal and transverse waves in this superfluid medium propagating with the velocity of light. The negative masses replace super-symmetry and permit to derive the Dirac equation. This model explains the small positive cosmological constant as the small positive gravitational field mass of gravitationally interacting positive and negative mass rotons, with their associated phonons making up 90% of the mass for the universe, with the rest coming from ordinary matter, and with the ratio of both remaining constant during the common cosmic expansion.

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