

TITLE: Multiverse Supersymmetry (SUSY) and Paradoxical MOND Inertia

AUTHOR: David Brown

## ABSTRACT

In July 2017 at the Institute for Advanced Study, Professor Nima Arkani-Hamed gave a lecture entitled “Where in the World are SUSY & WIMPS?” — is it possible that evidence for SUSY occurs not in the form of particles, but in the form of paradoxical MOND inertia caused by multiverse boundary conditions? Can MOND-string theory explain MOND’s empirical successes?

In the 2023 article ‘ “Fermi” bubbles are bursting from our galaxy. Their origin remains a mystery ‘, Adam Mann mentions the conventional thinking “... dark matter ... is thought to make up 80% of all matter in the universe ...” [1] — which is now the opinion of the vast majority of astronomers and astrophysicists. However, according to Mordehai Milgrom of the Weizmann Institute and a number of other astrophysicists (including Banik, Brada, Chae, Famaey, Lelli, Kroupa, McGaugh, Sanders, Scarpa, Schombert, and Zhao), Milgrom’s Modified Newtonian Dynamics (MOND) makes many empirically successful predictions. Milgrom suggests that there might not be any dark matter particles and the dark matter phenomenon might be entirely caused by MOND inertia. [2] Is it possible that MOND inertia actually exists within string vibrations and constitutes evidence in favor of supersymmetry? Consider hypotheses (a), (b), (c), (d), & (e):

(a) Without supersymmetry, string theory is mathematically awkward and unsatisfactory. [3]

(b) String vibrations occur in a MOND liquid-like lattice with two fundamental components (A) & (B): (A) tardyonic universes that are analogues of the liquid in the Leidenfrost effect and (B) a tachyonic, multiverse boundary layer that is an analogue of the insulating vapor in the Leidenfrost effect.

(c) All superpartners of particles in the Standard Model of particle physics transiently occur in the tachyonic, multiverse boundary layer and cannot be directly detected.

(d) The tachyonic, multiverse boundary layer creates MOND inertia, which has gravitational mass-energy = 0 and inertial mass-energy < 0. The MOND inertia occurs because the superpartners are trapped in the tachyonic, multiverse boundary layer.

(e) In the standard form of Einstein’s field equations, replace the  $-1/2$  by

$-1/2 + \text{MOND-inertia-data-function}$ , where MOND-inertia-data-function is a positive, single-valued function of the tachyonic, multiverse boundary layer. The only empirical evidence of supersymmetry consists of the MOND-inertia-data-function.

## REFERENCES

1. A. Mann, "Fermi" bubbles are bursting from our galaxy. Their origin remains a mystery. PNAS 120, e2318720120 (2023)
2. M. Milgrom, MOND as manifestation of modified inertia. arXiv [Preprint] (2023). <https://arxiv.org/abs/2310.14334>
3. E. Witten. Unraveling string theory. Nature 438, 1085 (2005).