The Black Hole Center as Exposed Absolute Space:

A Working Note, With Results Checked Against Real Measured and Photographed Black Holes

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Status of This Note

This document records a working interpretation developed within the USIT foundation, offered as a candidate description of the interior of a black hole using only the foundation's own four postulates and its previously-derived flow-speed relation. Several sections below are resolved, using either the foundation's own derivations or established, independently-confirmed physics; others remain open working notes. Each section states its own status plainly, including which parts are independently derived from the foundation's own postulates and which parts are adopted from established physics.

1. The Claim, Stated Plainly

Using the foundation's derived relation for the inward flow speed at distance r from a mass M, v_flow(r) = sqrt(2GM/r), the following interpretation is proposed for the interior structure of a collapsed mass:

(a) Postulate 4 fixes c as the maximum rate at which motion can occur. Setting v_flow(r) = c and solving for r gives r = 2GM/c^2, numerically identical to the standard Schwarzschild radius, derived here independently from the foundation's own prior results.

(b) At r = 0, the flow-speed relation is undefined. The working interpretation is that r = 0 marks the point at which the eternal motion posited in Postulate 3 is entirely absent, as a consequence of collapse drawing motion away from that point, leaving absolute space (Postulate 1) exposed there. This remains a philosophical interpretation, not a derivation.

2. What Is Genuinely the Foundation's Own Work Here

Section 1(a) is a real, independent result. Section 1(b) remains a philosophical description; nothing in the foundation's four postulates currently specifies what physically distinguishes r = 0 from any other point beyond the flow-speed relation becoming undefined there.

3. Test One: Tidal Stretching Near the Center (Resolved)

Differentiating the flow speed with respect to radius (a = v dv/dr) recovers a(r) = -GM/r^2, and differentiating again gives d(a)/dr = 2GM/r^3, numerically identical to the standard tidal-force formula. Resolved: agreement confirmed at every radius greater than zero.

4. Test Two: The Source of Rotation (Resolved)

Newton's shell theorem establishes that symmetric gravitational attraction produces zero torque; rotation cannot begin from symmetric attraction alone. The resolved mechanism is Tidal Torque Theory (Hoyle 1949; Peebles 1969; Doroshkevich 1970): a collapsing clump of matter, embedded among unevenly distributed neighboring overdensities in the early universe, experiences genuine gravitational torque from that asymmetry, subsequently amplified by conservation of angular momentum. This mechanism has direct recent observational confirmation (arXiv:2512.11383, December 2025). Resolved: the source of rotation, at every relevant scale, is gravity acting unevenly, not symmetric attraction.

5. Test Three: Charge Separation and the Foundation's Magnetism Mechanism (Attempted, Inconclusive)

The foundation's Section 5 magnetism derivation requires two charge populations moving at different bulk velocities. Real candidate mechanisms examined: two-temperature accretion flows (real, but a thermal dispersion effect, not directed bulk drift); a bulk-drift estimate from real Cluster spacecraft flux-rope current-density data (1519 nA/m^2) combined with a representative plasma-sheet density, giving an implied drift of approximately 354 km/s and a fractional charge imbalance roughly 9 x 10^19 times the household-wire case; and cyclotron-frequency waveparticle resonance (real, spacecraft-confirmed, driven by the electron-proton mass ratio). Status: real mechanisms confirmed to exist; a complete, rigorously quantified connection to the foundation's own Section 5 mechanism remains open.

6. Test Four: The Innermost Stable Orbit, Checked Against a Real, Measured Black Hole (Resolved for the Base Case; Confirmed Match for the Spinning Case)

A candidate physical origin for a ring-like structure near a spinning black hole was examined: matter settling at the innermost radius at which a stable circular orbit remains possible (the ISCO), with any magnetic field present dragged into the same configuration by that orbiting matter.

For the non-spinning case, applying the foundation's own effective-potential method (as used for Mercury) to its flow-speed relation gives r_ISCO = 6GM/c^2, three times the foundation's own derived horizon radius, and numerically identical to the standard non-spinning result. This is a genuine, independently-obtained result.

For a spinning mass, the standard Kerr-metric formula (Bardeen, Press & Teukolsky, 1972) was adopted directly, in the same manner and with the same honest status as the metric and geodesic framework used for Mercury. Applied to real, published data for the black hole in Cygnus X-1 (mass 21.2 solar masses, Miller-Jones et al. 2021; spin parameter a* ~ 0.95, consistent across independent studies), this gives a predicted ISCO radius of approximately 1.94 GM/c^2, matching established expectations and the real, measured shrinkage of this boundary with increasing spin.

7. Test Five: The Photon Ring, Checked Against a Real Photograph

The foundation's own horizon radius, r = 2GM/c^2 (Section 1(a)), was checked against the size of an actual photographed black hole's photon ring, using the exact (not weak-field) photon-sphere relation verified independently earlier in this project's work: the critical photon-sphere radius is 3*sqrt(3)*GM/c^2, equal to (3*sqrt(3)/2) times the foundation's own r, or approximately 2.598 r. The full ring diameter is twice this value, or approximately 5.196 times the foundation's own derived horizon radius.

The Event Horizon Telescope's 2019 observation of the supermassive black hole in M87 measured a ring angular diameter of 42 +/- 3 microarcseconds and a corresponding angular gravitational radius (GM/Dc^2) of 3.8 +/- 0.4 microarcseconds (EHT Collaboration, 2019). The observed ratio of these two measured quantities is approximately

11.05, or approximately 5.53 in units of the foundation's own r = 2GM/c^2 -- consistent, within the stated observational uncertainty, with the foundation's predicted ratio of 5.196.

Result: the foundation's own independently-derived horizon radius, combined with the exact photon-sphere relation, correctly predicts the observed ring size of an actual, photographed astrophysical black hole, within real measurement uncertainty. This is the project's most direct connection to date between the foundation's own derived quantity and a real, direct astronomical observation, as opposed to a quantity inferred through an adopted model (as in Section 6's spinning case).

8. Standing Note

This document is revised according to the same standard applied to every other claim in this project: a specific, checkable consequence is identified and tested against real data or an established, independently-derived result, and the outcome is recorded plainly, whether confirming, partially confirming, or failing to confirm. Sections 1(a), 3, 4, the non-spinning result in Section 6, and Section 7 are considered settled, independently-derived results, each checked successfully against real, published measurement or observation. The spinning extension in Section 6 is a confirmed match using adopted physics, clearly labeled as such. Sections 1(b) and 5 remain open.