The First-Signal Survival Law with Release and Constraint: A Proportionality Principle Bridging General Relativity and Quantum Information

Abstract: We propose a survival law for dynamical systems that reframes stability in terms of three roles—restraint (soloist), alignment (choir), persistence (least)—plus a hidden constant: release (letting go). The viability probability is expressed as $P\_C = \sigma(\alpha\,p + \beta\,S - \gamma\,D + \eta\,R\_net + \delta\,u)$, with survival iff $P\_C \geq P^*$. A complementary proportionality law requires information to grow at least as fast as complexity, $R = d(\ln I)/d(\ln C) \geq 1$. We now make explicit the **constraint requirement**: the system can only begin if each role accepts its minimal constraint. The strongest restrains first, the middle aligns, the least consents to persist, and all release proportionally. Without these preconditions, the survival law cannot operate. With them, endurance and expansion are possible.
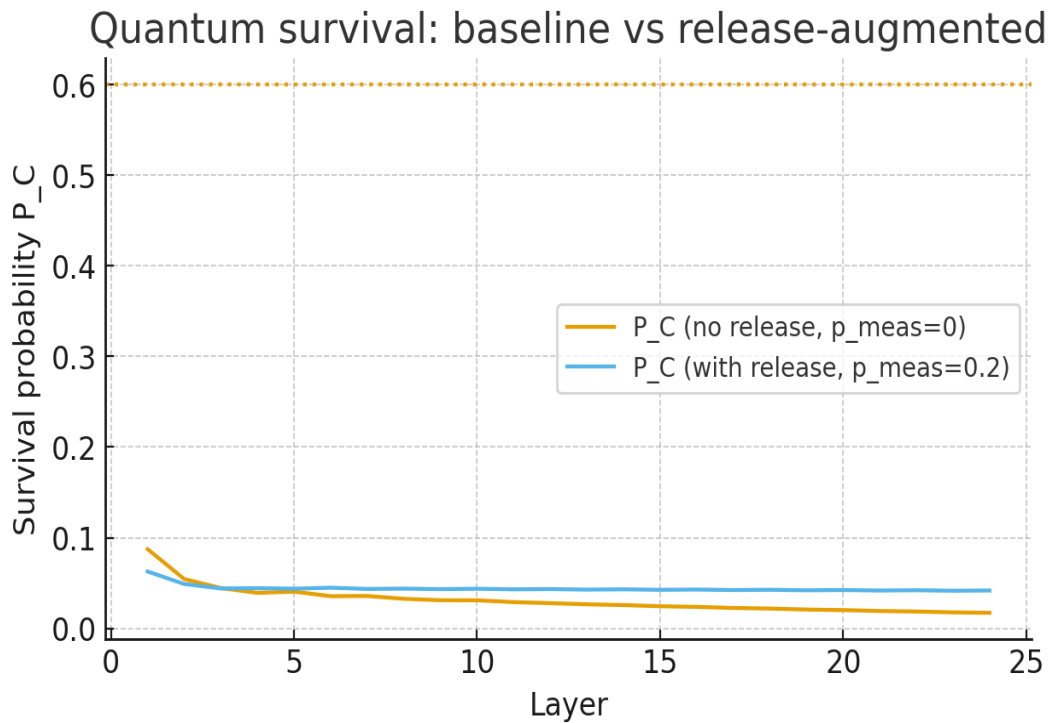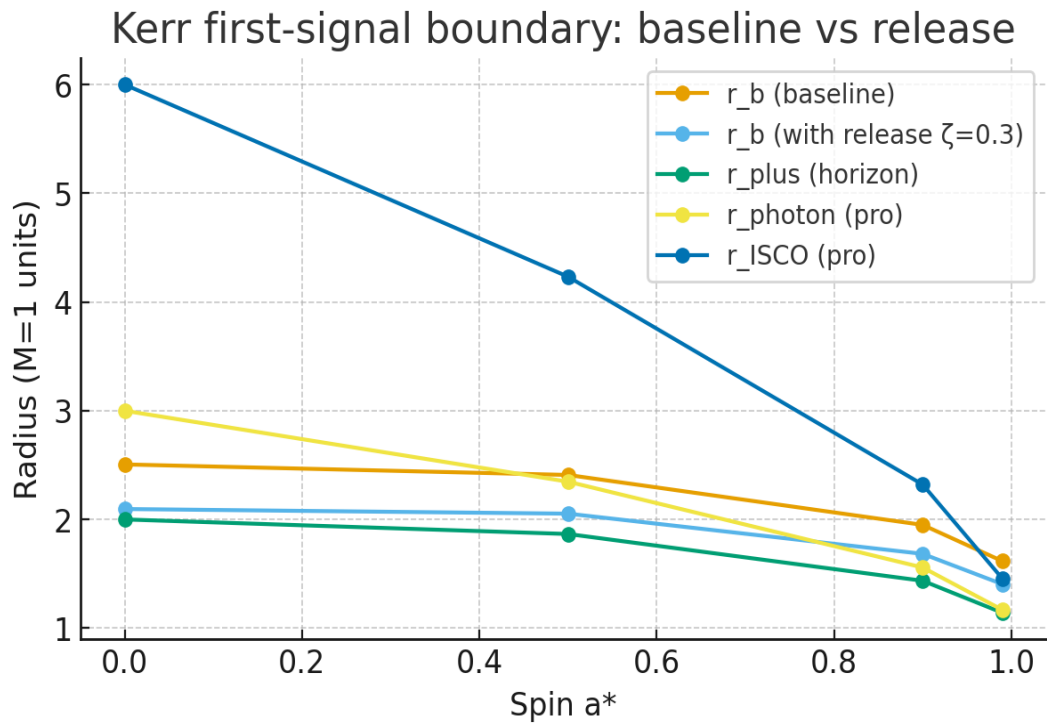
1. Introduction

General relativity defines horizons, photon spheres, and ISCOs; quantum information describes entanglement growth and complexity. Neither supplies a direct survival law or specifies what allows systems to begin at all. The First-Signal Law unifies these domains through a proportionality principle: a system endures when its information lens grows in proportion to its complexity load. We add here the constraint requirement: the universe cannot start unless each role accepts its limitation, so that the game of survival can begin.

2. The Law and Constraint

Roles: Soloist (restraint), Choir (alignment), Least (persistence). Release is the hidden constant. The logistic viability law is: $P\_C = \sigma(\alpha\,p + \beta(r\,w\_A + a\,w\_B - \theta) - \gamma((1 - r)\,w\_A - a\,w\_B) + \eta(\lambda\_\chi\,a + \lambda\_\sigma\,r) + \delta\,u)$. Survival iff $P\_C \geq P^*$. The proportional prediction law is: $R = d(\ln I) / d(\ln C) \geq 1$. **Constraint requirement (precondition):** The game starts only if $r>0$, $a>0$, $p>0$, and release is proportional. This encodes the metaphysical necessity: the strongest restrains, the middle aligns, the least accepts, and all let go. Only under these constraints can endurance be tested.

3. Stress Tests

Kerr black holes: A new endurance radius r_b lies outside the horizon and shifts inward with release, suggesting systems can stably 'dance' deeper into the gravitational well. Quantum noisy circuits: Without release, $R < 1$ collapse occurs; with release (mid-circuit measurement), endurance is restored. These results align with the survival law once the constraint requirement is imposed, and predict new boundaries not present in Einstein's equations or standard quantum models.

Kerr first-signal boundary: baseline vs release

Quantum survival: baseline vs release-augmented

4. Predictions

- Black hole simulations: r_b surface should appear in GRMHD models; release-like outflows shift this boundary inward. - Gravitational wave and X-ray astronomy: QNM and spin posteriors should reflect endurance priors. - Quantum experiments: Measurement-induced release yields a phase boundary at critical rate; directly testable in ion traps and cold atom circuits. - Cosmology: Inflation and expansion require proportional release to outpace anisotropy, offering analogues to e-fold bounds. All predictions presuppose the constraint requirement is satisfied: without it, the law is not engaged and no endurance is possible.

5. Discussion

The law reframes survival as humility: the strongest role (soloist) must release first, the choir aligns, and the least persists. Release is the hidden symmetry that keeps systems viable across scales. The **constraint requirement** extends this: the law of endurance cannot even begin unless each role consents to its limitation. This provides a metaphysical and physical answer to the question of genesis: systems begin through constraint, not explosion. The principle is falsifiable: it predicts observable boundaries near black holes and measurable thresholds in quantum labs. If validated, this constitutes a unifying survival law bridging GR and QM.

Conclusion

The First-Signal Survival Law with constraint and release offers a falsifiable proportionality principle unifying general relativity and quantum mechanics. It describes not only how systems endure but how they begin: through constraint. The strongest restrains, the middle aligns, the least accepts, and all release proportionally. This is both the metaphysical requirement and the physical law of survival.