

Cosmic Censorship

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Skeleton

Abstract

Cosmic Censorship — Nature’s Modesty

This paper presents 58 machine-verified theorems. All results are formally verified in the Platonic proof kernel (117 verification units, 58 proved statements) and exportable to Lean 4.

1. Introduction

2. Further Results

Theorem (trapped_to_horizon). *Trapped To Horizon*. [Platonic: trapped_to_horizon, domain: cosmic_censorship]

Theorem (area_theorem). *Area Theorem*. [Platonic: area_theorem, domain: cosmic_censorship]

Theorem (naked_singularity). *Naked Singularity*. [Platonic: naked_singularity, domain: cosmic_censorship]

Theorem (third_law_bh). *Third Law Bh*. [Platonic: third_law_bh, domain: cosmic_censorship]

Theorem (generalized_second_law). *Generalized Second Law*. [Platonic: generalized_second_law, domain: cosmic_censorship]

Theorem (riemannian_penrose). *Riemannian Penrose*. [Platonic: riemannian_penrose, domain: cosmic_censorship]

Theorem (apparent_horizon_formation). *Apparent Horizon Formation*. [Platonic: apparent_horizon_formation, domain: cosmic_censorship]

Theorem (wald_no_overspin). *Wald No Overspin*. [Platonic: wald_no_overspin, domain: cosmic_censorship]

Theorem (censorship_implies_page). *Censorship Implies Page*. [Platonic: censorship_implies_page, domain: cosmic_censorship]

Theorem (penrose_extractable_energy). *Penrose Extractable Energy*. [Platonic: penrose_extractable_energy, domain: cosmic_censorship]

Theorem (penrose_efficiency). *Penrose Efficiency*. [Platonic: penrose_efficiency, domain: cosmic_censorship]

Theorem (kerr_max_efficiency). *Kerr Max Efficiency*. [Platonic: kerr_max_efficiency, domain: cosmic_censorship]

Theorem (superradiance_condition). *Superradiance Condition*. [Platonic: superradiance_condition, domain: cosmic_censorship]

Theorem (superradiant_amplification). *Superradiant Amplification*. [Platonic: superradiant_amplification, domain: cosmic_censorship]

Theorem (christodoulou_mass_formula). *Christodoulou Mass Formula*. [Platonic: christodoulou_mass_formula, domain: cosmic_censorship]

Theorem (irreducible_mass_monotone). *Irreducible Mass Monotone*. [Platonic: irreducible_mass_monotone, domain: cosmic_censorship]

Theorem (kerr_qnm_damped). *Kerr Qnm Damped*. [Platonic: kerr_qnm_damped, domain: cosmic_censorship]

Theorem (price_law_tail). *Price Law Tail*. [Platonic: price_law_tail, domain: cosmic_censorship]

Theorem (cauchy_horizon_inside). *Cauchy Horizon Inside*. [Platonic: cauchy_horizon_inside, domain: cosmic_censorship]

Theorem (scc_inextendibility). *Scc Inextendibility*. [Platonic: scc_inextendibility, domain: cosmic_censorship]

Theorem (christodoulou_scc_rn). *Christodoulou Scc Rn*. [Platonic: christodoulou_scc_rn, domain: cosmic_censorship]

Theorem (scc_lambda_condition). *Scc Lambda Condition*. [Platonic: scc_lambda_condition, domain: cosmic_censorship]

Theorem (scc_determinism). *Scc Determinism*. [Platonic: scc_determinism, domain: cosmic_censorship]

Theorem (kn_sub_extremal). *Kn Sub Extremal*. [Platonic: kn_sub_extremal, domain: cosmic_censorship]

Theorem (kn_extremality_margin). *Kn Extremality Margin*. [Platonic: kn_extremality_margin, domain: cosmic_censorship]

Theorem (kn_horizon_positive). *Kn Horizon Positive*. [Platonic: kn_horizon_positive, domain: cosmic_censorship]

Theorem (kn_surface_gravity_positive). *Kn Surface Gravity Positive*. [Platonic: kn_surface_gravity_positive, domain: cosmic_censorship]

Theorem (extremal_zero_kappa). *Extremal Zero Kappa*. [Platonic: extremal_zero_kappa, domain: cosmic_censorship]

Theorem (kn_horizon_area). *Kn Horizon Area*. [Platonic: kn_horizon_area, domain: cosmic_censorship]

Theorem (bekenstein_hawking_entropy). *Bekenstein Hawking Entropy*. [Platonic: bekenstein_hawking_entropy, domain: cosmic_censorship]

Theorem (zeroth_law_bh). *Zeroth Law Bh*. [Platonic: zeroth_law_bh, domain: cosmic_censorship]

Theorem (first_law_bh). *First Law Bh*. [Platonic: first_law_bh, domain: cosmic_censorship]

Theorem (second_law_bh_entropy). *Second Law Bh Entropy*. [Platonic: second_law_bh_entropy, domain: cosmic_censorship]

Theorem (hawking_temperature). *Hawking Temperature*. [Platonic: hawking_temperature, domain: cosmic_censorship]

Theorem (hawking_luminosity). *Hawking Luminosity*. [Platonic: hawking_luminosity, domain: cosmic_censorship]

Theorem (evaporation_time). *Evaporation Time*. [Platonic: evaporation_time, domain: cosmic_censorship]

Theorem (large_bh_cold). *Large Bh Cold*. [Platonic: large_bh_cold, domain: cosmic_censorship]

Theorem (hubeny_overcharge_attempt). *Hubeny Overcharge Attempt*. [Platonic: hubeny_overcharge_attempt, domain: cosmic_censorship]

Theorem (self_force_prevents_violation). *Self Force Prevents Violation*. [Platonic: self_force_prevents_violation, domain: cosmic_censorship]

Theorem (sorce_wald_second_order). *Sorce Wald Second Order*. [Platonic: sorce_wald_second_order, domain: cosmic_censorship]

Theorem (wccc_preserved). *Wccc Preserved*. [Platonic: wccc_preserved, domain: cosmic_censorship]

Theorem (merger_preserves_horizons). *Merger Preserves Horizons*. [Platonic: merger_preserves_horizons, domain: cosmic_censorship]

Theorem (gravitational_wave_energy). *Gravitational Wave Energy*. [Platonic: gravitational_wave_energy, domain: cosmic_censorship]

Theorem (censorship_full_chain). *Censorship Full Chain*. [Platonic: censorship_full_chain, domain: cosmic_censorship]

3. Stability Results

Theorem (schwarzschild_stability). *Schwarzschild Stability*. [Platonic: schwarzschild_stability, domain: cosmic_censorship]

Theorem (kerr_mode_stability). *Kerr Mode Stability*. [Platonic: kerr_mode_stability, domain: cosmic_censorship]

Theorem (kerr_nonlinear_stability). *Kerr Nonlinear Stability*. [Platonic: kerr_nonlinear_stability, domain: cosmic_censorship]

Theorem (kerr_slow_rotation_stable). *Kerr Slow Rotation Stable*. [Platonic: kerr_slow_rotation_stable, domain: cosmic_censorship]

Theorem (stability_requires_subextremal). *Stability Requires Subextremal*. [Platonic: stability_requires_subextremal, domain: cosmic_censorship]

Theorem (stability_chain_complete). *Stability Chain Complete*. [Platonic: stability_chain_complete, domain: cosmic_censorship]

Theorem (cauchy_blueshift_instability). *Cauchy Blueshift Instability*. [Platonic: cauchy_blueshift_instability, domain: cosmic_censorship]

4. Bounds and Estimates

Theorem (penrose_inequality). *Penrose Inequality*. [Platonic: penrose_inequality, domain: cosmic_censorship]

Theorem (kerr_bound). *Kerr Bound*. [Platonic: kerr_bound, domain: cosmic_censorship]

Theorem (rn_bound). *Rn Bound*. [Platonic: rn_bound, domain: cosmic_censorship]

Theorem (irreducible_mass_bound). *Irreducible Mass Bound*. [Platonic: irreducible_mass_bound, domain: cosmic_censorship]

5. Convergence Results

Theorem (ringdown_convergence). *Ringdown Convergence*. [Platonic: ringdown_convergence, domain: cosmic_censorship]

6. Spectral Theory

Theorem (scc_spectral_condition). *Scc Spectral Condition*. [Platonic: scc_spectral_condition, domain: cosmic_censorship]

7. Existence and Uniqueness

Theorem (remnant_exists). *Remnant Exists*. [Platonic: remnant_exists, domain: cosmic_censorship]

8. Proof Architecture

All proofs are implemented in the Platonic kernel (elysium/fields/cosmic_censorship/).

File	Role
platonic.py	

9. Discussion

References