

Lux Papers Corpus Audit

117 .tex files, 76,152 lines, evidence-based analysis

Scientist Agent

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1 Question

How consistent, non-redundant, and technically rigorous is the Lux papers corpus? Specifically: (1) which papers are duplicates or near-duplicates, (2) which contain AI-generated filler, (3) which deviate from the canonical preamble, and (4) what is the recommended action for each?

2 Method

1. Read every `.tex` file's first 80 lines (title, author, date, documentclass, preamble, abstract).
2. Extract structural metadata: `documentclass` options, paper size, cover page invocation, bibliography style, `\input{shared/1stlang}`, column layout.
3. Grep for AI slop patterns: marketing language, LLM giveaway phrases, uncited superlatives.
4. Compare abstracts within each topical cluster to identify overlap.
5. Diff exact-duplicate candidates byte-for-byte.
6. Count `\cite{}` and `\bibitem` per file to identify uncited papers.

All file paths are absolute under `/Users/z/work/lux/papers/`.

3 Inventory: 117 Papers by Topical Cluster

3.1 Cluster 1: Core Consensus (7 papers)

1. `lux-consensus.tex` — Physics-inspired metastable consensus (Slush/Flare/Wave family). 1622 lines. Canonical.
2. `lux-quasar-consensus.tex` — Quasar: quantum-secure triple-proof consensus. 701 lines.
3. `lux-quantum-consensus.tex` — PQ secure multi-consensus with Dilithium/Kyber/SPHINCS+. 557 lines.
4. `lp-105-quasar-consensus.tex` — LP-105: Quasar formal specification (BLS + Ringtail + ML-DSA). 1398 lines. Canonical LP.
5. `lp-307-quantum-consensus-protocol.tex` — LP-307: Eisenstein-series quantum consensus (research direction). 465 lines.
6. `lux-triple-proof-consensus.tex` — Triple-proof quantum finality (BLS + STARK-ML-DSA + Ringtail). 323 lines.
7. `lux-fpc-consensus.tex` — Fast Probabilistic Consensus with adaptive thresholds. 970 lines.

3.2 Cluster 2: Physics Sub-Protocols (8 papers)

1. `lux-wave-protocol.tex` — Decision stability / confidence monotonicity in DAG consensus. 712 lines.
2. `lux-photon-protocol.tex` — Zero-latency pipelined binary consensus. 364 lines.
3. `lux-flare-protocol.tex` — Certificate/skip conviction-based finality. 520 lines.

4. `lux-nova-protocol.tex` — Supernova burst DAG consensus. 371 lines.
5. `lux-nebula-protocol.tex` — Probabilistic finality for sparse networks. 409 lines.
6. `lux-prism-protocol.tex` — Multi-spectrum parallel consensus. 432 lines.
7. `lux-ray-protocol.tex` — Adaptive finality with light-speed confirmation. 405 lines.
8. `lux-field-protocol.tex` — EM-field-inspired validator dipole consensus. 432 lines.

3.3 Cluster 3: MPC / Threshold Cryptography (6 papers)

1. `lux-threshold-mpc.tex` — Unified FROST + CGGMP21 for omnichain custody. 1368 lines. Canonical.
2. `lux-universal-threshold-signatures.tex` — Universal threshold sigs (CMP + FROST + LSS + Doerner). 975 lines.
3. `lux-lss-mpc.tex` — LSS: dynamic resharing framework. 332 lines.
4. `lux-mchain-mpc.tex` — M-Chain: on-chain MPC custody coordination. 886 lines.
5. `lux-validator-mpc.tex` — Threshold crypto for validator networks. 637 lines.
6. `mpc-custody.tex` — Non-custodial securities custody via threshold signing. 518 lines.

3.4 Cluster 4: Teleport / Bridges (7 papers)

1. `lux-teleport-architecture.tex` — Engineering architecture, wire format, chain adapters. 786 lines. Canonical.
2. `lux-teleport-omnichain.tex` — Sovereign omnichain liquidity protocol. 589 lines.
3. `lux-teleport-protocol.tex` — LITP: light-client cross-chain transfers. 858 lines.
4. `teleport/main.tex` — Teleport: omnichain bridge (April 2026 rewrite). 640 lines.
5. `lux-bridge.tex` — Lux Bridge with MPC + Quasar hybrid verification. 1149 lines.
6. `lux-warp-messaging.tex` — Intra-Lux BLS aggregate cross-appchain messaging. 805 lines.
7. `lux-secure-messaging.tex` — Authenticated cross-chain message envelope protocol. 370 lines.

3.5 Cluster 5: FHE (6 papers)

1. `lux-fhe-smart-contracts.tex` — FHE VM architecture for private DeFi. 661 lines.
2. `lux-fhe-api.tex` — Go API and developer model. 304 lines.
3. `lux-fhe-benchmarks.tex` — Performance benchmarks and cost models. 314 lines.
4. `lux-fhe-mpc-hybrid.tex` — FHE + MPC hybrid for trustless private computation. 330 lines.
5. `lux-tfhe.tex` — TFHE: torus threshold FHE with distributed decryption. 475 lines.
6. `threshold-fhe-compliance.tex` — Threshold FHE for regulatory forced decryption. 623 lines.

3.6 Cluster 6: Post-Quantum Cryptography (8 papers)

1. `lux-quantum-threat-blockchain.tex` — Systematic PQ threat model. 571 lines.
2. `lux-hybrid-pq-architecture.tex` — Hybrid classical + PQ architecture. 553 lines.
3. `lux-pq-migration.tex` — Three-phase PQ migration strategy. 349 lines.
4. `lux-crypto-agility.tex` — Live algorithm rotation without forks. 230 lines.
5. `lux-ringtail-pq.tex` — Ringtail: lattice-based threshold signatures. 480 lines.
6. `lux-ethfalcon-post-quantum.tex` — ETHFALCON: EVM-optimized FALCON variants. 914 lines.
7. `lux-lattice-cryptography-primer.tex` — Lattice crypto builder’s guide. 619 lines.
8. `lux-hybrid-certificates.tex` — Dual-sig X.509 for validators. 211 lines.

3.7 Cluster 7: EVM Execution / GPU (6 papers)

1. `gpu-evm-whitepaper.tex` — `cevm`: GPU-native EVM with PQ + FHE. 986 lines. Canonical.
2. `evmgpu-benchmark.tex` — GPU-accelerated EVM benchmarks on M1 Max. 697 lines.
3. `dag-evm-formal.tex` — DAG-EVM and conflict-graph consensus. 530 lines.
4. `lux-evm-precompiles.tex` — Custom EVM precompile suite. 804 lines.
5. `lux-evm-precompile-engineering.tex` — Precompile engineering tutorial. 583 lines.
6. `lux-pq-crypto-suite.tex` — ML-KEM/ML-DSA/SLH-DSA as native precompiles. 248 lines.

3.8 Cluster 8: NTT (2 papers)

1. `lux-ntt-transform.tex` — NTT on EVM with 85% gas reduction. 733 lines.
2. `lux-ntt-simd-implementation.tex` — NTT SIMD implementation tutorial. 495 lines.

3.9 Cluster 9: Governance / DAO (2 papers)

1. `lux-dao-governance-framework.tex` — Azorius-based modular DAO framework. 1638 lines.
2. `lux-governance-dao.tex` — Multi-ecosystem DAO with holographic consensus. 1100 lines.

3.10 Cluster 10: Identity (2 papers)

1. `lux-id-did-specification.tex` — DID specification (`did:lux:address`). 1092 lines.
2. `lux-id-iam.tex` — Lux.id: full IAM system (Casdoor-based). 1138 lines.

3.11 Cluster 11: Economics (3 papers)

1. `lux-tokenomics.tex` — LUX token supply, rewards, fee-burning. 803 lines.
2. `lux-economics.tex` — Appchain economics (validator attraction, fee revenue). 1011 lines.
3. `lux-validator-economics.tex` — Validator incentives, slashing, delegation. 826 lines.

3.12 Cluster 12: DeFi / Markets (8 papers)

1. `lux-lightspeed-dex.tex` — High-frequency DEX. 683 lines.
2. `lux-perpetuals-derivatives.tex` — Perpetuals with automated risk management. 866 lines.
3. `lux-omnichain-yield.tex` — Yield-bearing bridge tokens. 943 lines.
4. `lux-liquid-staking.tex` — Tokenized validator positions. 904 lines.
5. `lux-restaking.tex` — Restaking for security extension. 1139 lines.
6. `lux-smart-order-routing.tex` — Multi-provider execution routing. 676 lines.
7. `lux-privacy-pool.tex` — Compliant privacy pools. 810 lines.
8. `lux-sovereign-defi.tex` — Per-chain governance, Shariah compliance, ERC-3643. 965 lines.

3.13 Cluster 13: Local-First / Capsule / Web5 (5 papers)

1. `lux-capsule-architecture.tex` — Capsule: sovereign encrypted process. 1054 lines. Canonical.
2. `lux-app-architecture.tex` — Identical to capsule-architecture (see §4). 1053 lines.
3. `lux-firebase-exit.tex` — Firebase Exit migration path. 794 lines.
4. `lux-web5-private-apps.tex` — Web5 local-first architecture overview. 104 lines.
5. `lux-sovereign-keys.tex` — Key management for local-first apps. 569 lines.

3.14 Cluster 14: Formal Verification / Testing (6 papers)

1. `lux-formal-verification-lean4.tex` — Lean 4 verification tutorial. 734 lines.
2. `lux-model-checking-tla.tex` — TLA+ model checking tutorial. 577 lines.
3. `lux-protocol-verification-tamarin.tex` — Tamarin security protocol verification. 531 lines.
4. `lux-symbolic-execution-halmos.tex` — Halmos symbolic execution for contracts. 588 lines.
5. `lux-proof-methodology.tex` — Proof obligations and verification tiers. 285 lines.
6. `lux-fuzz-testing-methodology.tex` — Property-based testing and fuzzing. 484 lines.

3.15 Cluster 15: Chain Architecture (5 papers)

1. `lux-whitepaper.tex` — The Lux Network whitepaper. 535 lines. Canonical.
2. `lux-chain-architecture.tex` — 12-chain architecture overview. 204 lines.
3. `lux-zchain.tex` — Z-Chain: ZK-UTXO privacy chain. 493 lines.
4. `lux-gchain-graphql.tex` — G-Chain: GraphQL query engine. 753 lines.
5. `lux-achain-attestation.tex` — A-Chain: TEE attestation for AI compute. 494 lines.

3.16 Cluster 16: Infrastructure / LP Standards (5 papers)

1. `lp-102-encrypted-sqlite-replication.tex` — Encrypted SQLite replication. 1075 lines.
2. `lp-103-omnichain-explorer.tex` — Single-binary block explorer. 309 lines.
3. `lp-104-graph-engine.tex` — Embedded subgraph-compatible GraphQL. 247 lines.
4. `lp-checkpoint-anchor.tex` — On-chain checkpoint anchoring. 430 lines.
5. `chain-first-architecture.tex` — Blockchain as source of truth for regulated finance. 531 lines.

3.17 Cluster 17: Quantum LP Series (5 papers)

1. `lp-305-quantum-secure-assets.tex` — LP-305: Quantum secure assets. 449 lines.
2. `lp-306-lx-social-dex.tex` — LP-306: LX social trading exchange. 302 lines.
3. `lp-308-quantum-amm.tex` — LP-308: QuantumSwap AMM. 509 lines.
4. `lp-309-quantum-network-comparison.tex` — LP-309: Quantum network comparison. 422 lines.

3.18 Cluster 18: Security / Operations (7 papers)

1. `lux-master-security-model.tex` — Comprehensive security model. 669 lines.
2. `lux-cross-chain-security.tex` — Multi-chain security architecture. 353 lines.
3. `lux-hsm-boundary.tex` — HSM and threshold boundary design. 221 lines.
4. `lux-zero-trust-validators.tex` — Zero-trust validator operations. 229 lines.
5. `lux-reproducible-builds.tex` — Signed software and build pipelines. 262 lines.
6. `lux-performance-security-tradeoffs.tex` — Performance vs security tradeoffs. 416 lines.
7. `lux-smart-contract-auditing.tex` — Systematic auditing methods. 582 lines.

3.19 Cluster 19: Data / State (4 papers)

1. `lux-data-availability.tex` — Data availability sampling. 1105 lines.
2. `lux-state-sync.tex` — Merkle range proof state sync. 801 lines.
3. `lux-verkle-trees.tex` — Verkle trees for stateless clients. 918 lines.
4. `lux-fraud-proofs.tex` — Optimistic rollup fraud proofs. 1327 lines.

3.20 Cluster 20: Miscellaneous (8 papers)

1. `ethos-of-lux.tex` — Eight design principles. 285 lines.
2. `lux-adoption-roadmap.tex` — Research-to-deployment roadmap. 289 lines.
3. `lux-agent-sovereignty.tex` — AI agents as first-class processes. 564 lines.
4. `lux-agentic-consensus-zap.tex` — Multi-agent AI consensus over ZAP. 267 lines.
5. `lux-decentralized-cloud.tex` — Providers as relays/storage/compute markets. 861 lines.
6. `lux-market-nft.tex` — NFT marketplace aggregator. 754 lines.
7. `lux-oracle-infrastructure.tex` — Decentralized price feeds. 823 lines.
8. `lux-tee-computing-mesh.tex` — TEE confidential computing infrastructure. 675 lines.

3.21 Non-Papers (2 files)

1. `cover-lux.tex` — Standalone cover page. 36 lines. Not a paper.
2. `lux-threshold-ux.tex` — Threshold UX product design. 812 lines.
3. `lux-trust-kernel.tex` — Trust kernel: identity + key policy + threshold governance. 849 lines.
4. `lux-distributed-systems-testing.tex` — Testing from unit to Jepsen. 669 lines.
5. `lux-security-token-standard.tex` — ERC-1400 on PQ EVM with MPC custody. 676 lines.

Total: 117 .tex files (115 papers + 1 shared file + 1 standalone cover).

4 Duplicates and Overlaps

4.1 EXACT DUPLICATE: `lux-app-architecture.tex` = `lux-capsule-architecture.tex`

These are the same paper. Both have identical title (“The Capsule: A Sovereign Encrypted Process for Web5 Computing”), identical abstract, identical author (Zach Kelling), identical date (2025). A byte-level diff shows only 2 differences: (1) `capsule-architecture` adds one sentence with a `\cite{lux-tokenomics}` reference, and (2) it replaces UTF-8 tree-drawing characters (, ,) with ASCII equivalents (|-, +-).

Action: Delete `lux-app-architecture.tex`. Keep `lux-capsule-architecture.tex` (it has the citation fix).

4.2 NEAR-DUPLICATE: `teleport/main.tex` $\approx$ `lux-teleport-omnichain.tex`

Both cover the same protocol: Lux Teleport non-custodial omnichain bridge. Abstracts are nearly identical (“270+ blockchains,” “FROST and CGGMP21,” same three innovations). Section structures differ by 2 sections. `teleport/main.tex` is the April 2026 rewrite (640 lines, twocolumn, different preamble), `lux-teleport-omnichain.tex` is the 2022 (revised December 2025) version (589 lines, onecolumn).

Action: Keep `teleport/main.tex` as canonical (newest). Delete `lux-teleport-omnichain.tex` or archive it as v1.

4.3 HIGH OVERLAP: Consensus Cluster (7 papers, 3 redundant)

The consensus cluster has significant redundancy:

- `lux-consensus.tex` (1622 lines) — the comprehensive canonical paper covering the full Slush/Flare/Wave/Nova/Nebula/Prism/Quasar stack with Lean 4 proofs.
- `lp-105-quasar-consensus.tex` (1398 lines) — the formal LP specification of Quasar. Legitimate companion to the above.
- `lux-fpc-consensus.tex` (970 lines) — FPC as the “wave” layer. Focused sub-protocol paper. Legitimate.
- **`lux-quasar-consensus.tex`** (701 lines) — an earlier, less formal treatment of Quasar. Superseded by LP-105. Claims “4,761,904 TPS with finality” without reproducible benchmark. **Superseded.**
- **`lux-quantum-consensus.tex`** (557 lines) — early 2022 paper claiming “first high-performance blockchain ready for the quantum era” and “50,000+ TPS.” Superseded by LP-105 and LP-307. Contains Keywords section (unusual for the corpus). **Superseded.**
- `lp-307-quantum-consensus-protocol.tex` (465 lines) — Eisenstein-series quantum consensus. Explicitly labels itself a “2023 research direction” with status section. Legitimate exploratory paper.
- `lux-triple-proof-consensus.tex` (323 lines) — focused on the BLS + STARK-ML-DSA + Ringtail triple-proof mechanism. Uses non-standard preamble (see §6). Could be merged into LP-105.

4.4 HIGH OVERLAP: MPC Cluster (6 papers, 2 redundant)

- `lux-threshold-mpc.tex` (1368 lines) — canonical unified framework paper covering FROST + CGGMP21 + chain adapters.
- `lux-universal-threshold-signatures.tex` (975 lines) — covers CMP + FROST + LSS + Doerner. Broader scope but overlaps 60–70% with threshold-mpc. Claims “over four years of continuous development (February 2021 - August 2025, 800+ commits)” which is marketing.
- `lux-lss-mpc.tex` (332 lines) — focused on LSS dynamic resharing. Legitimate sub-topic paper.
- `lux-mchain-mpc.tex` (886 lines) — M-Chain: the on-chain coordination layer for MPC. Distinct enough from the crypto papers.
- **`lux-validator-mpc.tex`** (637 lines) — threshold crypto for validators. Heavily overlaps with threshold-mpc. Covers the same CGGMP21 + FROST + DKG content but scoped to validators. **Merge into threshold-mpc.**
- `mpc-custody.tex` (518 lines) — non-custodial securities custody. Distinct application focus (2-of-3 threshold for user wallets).

4.5 HIGH OVERLAP: Teleport Cluster (4+ papers, 2 redundant)

Beyond the near-duplicate noted above:

- `lux-teleport-architecture.tex` (786 lines) — engineering spec: wire format, chain adapters, multi-tenant. Canonical.
- `lux-teleport-protocol.tex` (858 lines) — LITP: light-client verification, Warp intra-ecosystem, lock-and-mint. Legitimate protocol layer paper.
- `lux-bridge.tex` (1149 lines) — “Lux Bridge” with MPC + Quasar hybrid verification. The bibliography explicitly notes it is superseded by `lux-teleport-omnichain.tex`. **Superseded.**
- `lux-warp-messaging.tex` (805 lines) — BLS aggregate cross-appchain messaging. Distinct protocol (intra-Lux only).
- `lux-secure-messaging.tex` (370 lines) — message envelope specification. Could be an appendix to teleport-architecture.

4.6 HIGH OVERLAP: DAO Cluster (2 papers)

- `lux-dao-governance-framework.tex` (1638 lines) — Azorius framework, ERC-4337, Hats Protocol. Technical implementation paper.
- `lux-governance-dao.tex` (1100 lines) — multi-ecosystem DAO with holographic consensus. Higher-level governance design. Uses manual numbered references instead of BibTeX. Contains specific claims (“94 LPs successfully activated,” “\$128M treasury,” “12,847 active participants”) without external citation.

Both are DAO governance papers but at different abstraction levels. The governance-dao paper is significantly more bloated (36 slop-word hits). **Merge governance-dao’s unique content into dao-governance-framework.**

4.7 MODERATE OVERLAP: EVM Precompiles (3 papers)

- `lux-evm-precompiles.tex` (804 lines) — full precompile suite (BLS12-381, BN254, batch ecrecover, PQ, Warp).
- `lux-evm-precompile-engineering.tex` (583 lines) — engineering tutorial on building precompiles. Distinct pedagogical purpose.
- `lux-pq-crypto-suite.tex` (248 lines) — ML-KEM/ML-DSA/SLH-DSA precompiles specifically. Subset of evm-precompiles but more focused on the three FIPS standards.

Minor overlap. All three can coexist if pq-crypto-suite is positioned as the focused PQ-only companion to the broader precompiles paper.

4.8 MODERATE OVERLAP: Local-First (3+ papers)

`lux-capsule-architecture.tex`, `lux-firebase-exit.tex`, `lux-web5-private-apps.tex`, and `lux-sovereign-keys.tex` all cover the local-first encrypted-SQLite architecture. They are at different abstraction levels: web5 (104 lines) is a 2-page overview, firebase-exit is the migration narrative, capsule is the full spec, sovereign-keys is the key management layer. Acceptable stratification but web5-private-apps is too thin to justify a standalone paper.

4.9 ACCEPTABLE: FHE Cluster (6 papers)

Six papers covering distinct sub-topics: API, benchmarks, MPC hybrid, smart contracts, TFHE, compliance. This is a well-stratified cluster with clear separation of concerns.

4.10 ACCEPTABLE: Physics Sub-Protocols (8 papers)

Each of Photon, Wave, Flare, Nova, Nebula, Prism, Ray, Field covers a distinct consensus sub-protocol with different algorithmic contributions. The main overlap risk is with `lux-consensus.tex` which surveys all of them, but these are deeper treatments of individual protocols.

5 AI Slop / Hyperbole

5.1 Worst Offenders (slop-word density per 1000 lines)

File	Lines	Slop hits	Worst phrases
<code>lux-governance-dao.tex</code>	1100	36	“holistic,” “comprehensive,” “seamless,” “ecosystem” (26 uses), “robust foundation,” “blueprint for multi-ecosystem governance”
<code>lux-dao-governance-framework.tex</code>	1638	30	“cutting-edge technologies,” “solid foundation for the next generation,” “significant advancement”
<code>lux-perpetuals-derivatives.tex</code>	866	20	“comprehensive,” “seamless,” “innovative,” “leveraged” (sometimes legitimate financial term)
<code>lux-id-iam.tex</code>	1138	19	“unprecedented challenges,” “comprehensive,” “seamless integration”
<code>lux-market-nft.tex</code>	754	17	“seamless,” “comprehensive,” “next-generation,” “cornerstone of the evolving NFT economy,” “positioning Lux.market as...”
<code>lux-liquid-staking.tex</code>	904	15	“comprehensive,” “innovative,” “seamless,” “ecosystem” (14 uses)
<code>lux-oracle-infrastructure.tex</code>	823	13	“robust foundation for the next generation of decentralized applications, bridging the gap between on-chain logic and real-world data”
<code>lux-fraud-proofs.tex</code>	1327	12	“positions Lux at the forefront,” “unprecedented opportunities,” “robust fraud proof framework”

5.2 Specific Offending Phrases (with file:line)

Marketing superlatives:

- “positions Lux Network at the forefront of blockchain security for the next generation” — `lux-quasar-consensus.tex:603`
- “unprecedented challenges for identity” — `lux-id-iam.tex:61`
- “unprecedented opportunities for decentralized AI services” — `lux-fraud-proofs.tex:1186`
- “unprecedented composability” — `lux-gchain-graphql.tex:657`

- “cutting-edge technologies” — `lux-dao-governance-framework.tex:1542`
- “cornerstone of the evolving NFT economy” — `lux-market-nft.tex:715`
- “blueprint for the next generation of universal identity platforms” — `lux-id-did-specification.tex:760`
- “bridging the gap between cryptographic theory and blockchain practicality” — `lux-ethfalcon-post-quantum-abstract`
- “paving the way for quantum-resistant blockchain systems” — `lux-ntt-transform.tex` abstract
- “This work represents the first production-ready NTT implementation for EVM” — `lux-ntt-transform.tex` abstract
- “solid foundation for the next generation of decentralized organizations” — `lux-dao-governance-framework.tex`

LLM giveaway patterns:

- No instances of “In the rapidly evolving landscape” — **clean**
- No instances of “delving deeper” — **clean**
- 2 instances of “Additionally” (legitimate usage) — **acceptable**
- Extensive use of “comprehensive” (219 total hits for tracked slop words) concentrated in 8 papers

Uncited specific claims (in governance-dao):

- “94 LPs successfully activated” — no source
- “\$128M treasury managed transparently” — no source
- “12,847 active participants” — no source
- “18.3% voter participation (4-5x higher than typical DAOs)” — no source for the comparison

6 Structural Inconsistencies

6.1 Preamble / Cover Page

Pattern	Count	Notes
Uses <code>shared/luxcover + \luxcoverpage</code>	108	Canonical pattern
Uses <code>\maketitle</code> instead of <code>luxcover</code>	7	<code>lp-103</code> , <code>lp-104</code> , <code>lux-chain-architecture</code> , <code>lux-web5-private-apps</code> , <code>lux-sovereign-defi</code> , <code>lux-omnichain-yield</code> , <code>teleport/main.tex</code>
No cover at all	2	<code>lux-agentic-consensus-zap</code> , <code>lux-triple-proof-consensus</code>
Standalone cover file	1	<code>cover-lux.tex</code> (not referenced by any paper)

`lux-agentic-consensus-zap.tex` and `lux-triple-proof-consensus.tex` use a completely different preamble: `fancyhdr` with `\rhead/\lhead`, `titlesec` custom section formatting, `parskip`, manual `\begin{center}` title block. No `shared/luxcover`, no `\title{}`, no `\author{}`, no `\date{}`.

6.2 Paper Size

Paper size		
a4paper		
letterpaper	6	(lightspeed-dex, pq-crypto-suite, quantum-consensus, tee-computing-mesh, zap-benchmark)
No size specified		

6.3 Column Layout

Layout		
Single column (default)		
twocolumn	5	(lux-web5-private-apps, teleport/main.tex, lux-omnichain-yield, lux-threshold-mpc)

6.4 Bibliography Style

Style	Count	Notes
bibliographystyle{plain}	32	Most common
bibliographystyle{plainnat}	4	consensus, economics, restaking, web5
thebibliography only (inline)	77	
Manual numbered list (\item)	1	lux-governance-dao.tex
No bibliography at all	4	lux-zchain, cover-lux, lux-fraud-proofs, lux-governance-dao

6.5 Date Formats

Five distinct date formats in use:

1. Year only: “2024” (most common, 60+ papers)
2. Month Year: “February 2025” (12 papers)
3. Original/Revised with \quad\quad: “Original: 2022 | Revised: February 2026” (12 papers)
4. Year with parenthetical revision: “2022 (Revised December 2025)” (3 papers)
5. Empty: 2 papers (teleport/main.tex, lux-agentic-consensus-zap.tex)

6.6 Author Attribution

Author format	Count	Notes
Zach Kelling (sole, with thanks/affiliation)	~90	Standard
Zach Kelling + Vishnu Seesahai	12	bridge, teleport-*, threshold-*, sovereign-defi, etc.
“Lux Architecture Team”	2	lp-103, lp-104
“Lux Industries, Inc.” (in \begin{center} block)	2	lux-agentic-consensus-zap, lux-triple-proof-consensus
Vishnu J. Seesahai (sole)	1	lux-lss-mpc
No \author command	2	agentic-consensus-zap, triple-proof-consensus

6.7 Papers Without `\input{shared/lstlang}`

37 papers that include code listings lack `\input{shared/lstlang}`. This is not always an error (some define their own `minimal lstset`), but papers using Solidity, Go, Rust, or TypeScript code should use the shared definitions.

6.8 Papers With Zero `\cite{}` Commands

37 of 115 papers (32%) contain zero inline citations. They have `\bibitem` entries in a bibliography section but never reference them with `\cite{}` in the text body. This means every bibliographic reference is decorative — readers cannot trace any claim to a specific source. Notable offenders:

- `chain-first-architecture.tex` (531 lines, 0 cites)
- `lux-fraud-proofs.tex` (1327 lines, 0 cites)
- `lux-governance-dao.tex` (1100 lines, 0 cites)
- `lux-id-iam.tex` (1138 lines, 0 cites — has `\bibitem`s but never cites them)
- `lux-gchain-graphql.tex` (753 lines, 0 cites)
- `lux-oracle-infrastructure.tex` (823 lines, 0 cites)
- `lux-perpetuals-derivatives.tex` (866 lines, 0 cites)

7 Recommendations

7.1 DELETE (5 files)

1. `lux-app-architecture.tex` — exact duplicate of `capsule-architecture`.
2. `lux-teleport-omnichain.tex` — superseded by `teleport/main.tex`.
3. `lux-bridge.tex` — self-identifies as superseded in its own bibliography.
4. `cover-lux.tex` — standalone cover page, not referenced by any paper.
5. `lux-quasar-consensus.tex` — superseded by `lp-105-quasar-consensus.tex`. Contains unsubstantiated “4.7M TPS” claim.

7.2 MERGE (4 actions)

1. Merge `lux-quantum-consensus.tex` into `lp-105-quasar-consensus.tex` — the LP is the canonical Quasar spec; the 2022 paper adds nothing the LP does not cover.
2. Merge `lux-validator-mpc.tex` into `lux-threshold-mpc.tex` — validator-specific threshold content belongs in the unified framework paper.
3. Merge `lux-governance-dao.tex` into `lux-dao-governance-framework.tex` — the DAO-framework paper is more technical; the governance-dao paper’s unique content (holographic consensus, LP process, cross-ecosystem coordination) should be absorbed as sections.
4. Merge `lux-secure-messaging.tex` into `lux-teleport-architecture.tex` — the message envelope spec is part of the Teleport architecture.

7.3 REWRITE (8 papers need significant cleanup)

1. `lux-market-nft.tex` — marketing document masquerading as a paper. 17 slop-word hits. “cornerstone of the evolving NFT economy.” Rewrite as concise technical spec or delete.
2. `lux-oracle-infrastructure.tex` — conclusion is pure marketing (“robust foundation for the next generation”). Strip marketing language, add inline citations.
3. `lux-fraud-proofs.tex` — 1327 lines with zero `\cite{}`. “unprecedented opportunities.” “positions Lux at the forefront.” Add citations, remove superlatives.
4. `lux-id-iam.tex` — “unprecedented challenges.” 14 uses of “ecosystem.” 0 inline citations despite 10 bibitems. Wire up citations.
5. `lux-gchain-graphql.tex` — “unprecedented composability.” “next-generation multi-chain experiences.” 0 inline citations. Strip conclusion slop.
6. `lux-ntt-transform.tex` — “paving the way” and “first production-ready” in abstract. Remove superlatives. The technical content (85% gas reduction) stands on its own.
7. `lux-perpetuals-derivatives.tex` — 0 inline citations, 20 slop-word hits. Heavy on “comprehensive” and “seamless.”
8. `lux-liquid-staking.tex` — 15 slop-word hits, 14 uses of “ecosystem.” Tighten language.

7.4 STANDARDIZE PREAMBLE (2 papers need immediate fix)

`lux-agentic-consensus-zap.tex` and `lux-triple-proof-consensus.tex` use a completely non-standard preamble (`fancyhdr`, `titlesec`, manual center-block title, no `\title/author/date`, no `luxcover`). Convert to the canonical template.

7.5 Canonical Preamble Template

All Lux papers should use this structure:

```
\documentclass[11pt,a4paper]{article}
\usepackage{shared/luxcover}
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}
\usepackage{amsmath,amssymb,amsfonts,amsthm}
\usepackage{hyperref}
\usepackage{booktabs}
\usepackage{listings}
\usepackage{xcolor}
\input{shared/lstlang}      % when code listings are used
% ... additional packages as needed ...

\title{Paper Title}
\author{
  Zach Kelling\thanks{zach@lux.network}\\
  \textit{Lux Industries}\\
  \texttt{research@lux.network}
}
\date{Original: YYYY\quad|\quad Revised: Month YYYY}
```

```

\begin{document}
\luxcoverpage
\begin{abstract} ... \end{abstract}
\tableofcontents
\newpage

```

Key rules:

1. Always `a4paper`, never `letterpaper` (6 papers to fix).
2. Always `onecolumn` unless the paper is genuinely short (5 papers to assess).
3. Always `\luxcoverpage`, never `\maketitle` (7 papers to fix).
4. Always use `\cite{}` to reference bibitems (37 papers to fix).
5. Date format: “Original: Month YYYY\quad\quad Revised: Month YYYY” for revised papers, “Month YYYY” for new papers.
6. Author: “Zach Kelling” (with co-authors where applicable), never “Lux Architecture Team.”

7.6 Priority Actions

1. **Immediate:** Delete the 5 files listed above.
2. **Week 1:** Fix the 2 non-standard preambles, 7 `maketitle`-instead-of-`luxcover` papers, and 6 `letterpaper` papers.
3. **Week 2:** Execute the 4 merges.
4. **Week 3:** Rewrite the 8 papers flagged for slop.
5. **Ongoing:** Wire up `\cite{}` in the 37 papers that have bibitems but zero inline citations.

8 Sources

All findings are based on direct file inspection of `/Users/z/work/lux/papers/`. Line numbers cited are from the files as of April 13, 2026. No external sources were consulted; this is a structural/content audit, not a correctness review.