TASK TITLE
Kanishk Singh, Quantum No-Go Limits & Architectural Boundary Proofs
(Product: Quantum Computing – Core Architecture Foundations)

READ THIS FIRST (MANDATORY)

This task is about defining and enforcing the absolute limits of a quantum-aligned system.
You are responsible for identifying what the system must never be able to do, regardless of intent, optimization, or future hardware.
You must convert quantum and information-theoretic limits into hard architectural boundaries.
You are NOT allowed to introduce execution authority, orchestration logic, hidden global state, rollback, learning-based correction, or bypass paths.
The outcome must represent architecture that fails deterministically and irreversibly when an impossible operation is attempted.

INTEGRATION / VALIDATION

No active integration with any system.
This task is self-contained.
Single validation checkpoint: Post-completion review with Vinayak.

TIMELINE (EXECUTION EFFORT)

Task Arc: 1.5 -day scope
Expected execution effort: ~8–12 hours of focused, AI-augmented work
Hard stop once boundaries are sealed and defensible

DAY-BY-DAY BREAKDOWN

Day 1

a— Learning: Quantum & Information Limits
Internalize and restate in your own words:
• No-cloning intuition
• No-deleting intuition
• Measurement disturbance
• Irreversibility of information loss
Focus on why these are limits, not formal proofs.

b— Learning: System Translation
Translate limits into system terms:
• What operations must be forbidden
• What states must be unreachable
• What transitions must never exist
• Why intent or configuration must not override limits

c— Design: Architectural No-Go Rules
Formally specify:
• A closed set of “impossible operations”
• Inputs that appear valid but must be rejected
• Conditions that must cause irreversible failure or confidence degradation

d— Build: Boundary Enforcement Primitive
Implement a minimal architectural layer that:
• Intercepts forbidden operations
• Prevents cloning, rollback, or state resurrection
• Emits explicit, irreversible boundary violations

Day 1.5

a— Adversarial Scenarios

Demonstrate resistance to:
• Forced duplication attempts
• Retroactive reconstruction
• Confidence inflation after measurement or collapse

b— Validation
Show:
• Why boundaries cannot be bypassed
• Why any workaround would imply falsification or loss of truth

c— Documentation & Seal
Produce:
• No-go boundary registry
• Explicit guarantees
• Explicit non-guarantees
• Audit-ready handover notes

LEARNING KITS (MANDATORY)

Video / Keywords:
• No-cloning theorem intuition
• Quantum measurement disturbance
• Information loss and irreversibility

Reading:
• Nielsen & Chuang — No-cloning, measurement, information limits
• Basic information theory (entropy, loss)

LLM LEARNING TASKS:
Ask LLMs:
• “Why can’t destroyed information be recovered truthfully?”
• “Why does cloning imply falsification?”
• “When does correction become lying?”

Validate answers against first principles.

DELIVERABLES (NON-NEGOTIABLE)

- Updated repository
- No-go boundary registry (plain text)
- Minimal enforcement implementation
- Adversarial validation evidence
- Complete documentation and handover

PROFESSIONAL CLOSING NOTE