Patent Overview – Quantum Operation Execution Including Flux Field Stabilization Engine

One-liner:
A software-driven, physics-augmented framework for improving quantum circuit execution stability, fidelity, and efficiency through real-time qubit environment modeling and adaptive control.

Elevator Summary (conference-safe):
This invention describes a hardware-agnostic quantum execution enhancement system that models the dynamic environment around each qubit and proactively adjusts execution parameters in real time. By stabilizing flux-related interactions and synchronizing operations across single or multiple quantum processors, it reduces error rates, extends coherence time, and lowers power consumption — all without adding complex hardware or requiring additional error-correcting qubits. The system integrates with existing toolchains, works across various qubit modalities, and can operate locally, in the cloud, or directly on-chip.

Key Benefits:

- **Higher Fidelity:** Pre-emptively suppresses noise before it propagates.
- **Extended Coherence:** Maintains qubit stability for deeper, more complex circuits.
- **Multi-QPU Synchronization:** Keeps entangled states aligned across devices without extra interconnect hardware.
- **Lower Power & Hardware Demand:** Reduces reliance on extensive cooling and redundant qubits.
- **Seamless Integration:** Works with multiple quantum platforms and SDKs.

Compatibility:
Superconducting, trapped-ion, photonic, and other qubit platforms; supports IBM, Quantinuum, IonQ, Rigetti, and AWS Braket systems; interoperates with major quantum programming frameworks.

Intended Users:
Quantum algorithm developers, HPC and R&D teams, national labs, quantum cloud service providers.

Proof Points (safe to state):

- Benchmarked performance improvements on real quantum hardware.

- Demonstrated multi-device coherence retention.
- Available integration examples under NDA.

Differentiators (non-enabling):

- Predictive, not reactive — adjusts before decoherence occurs.
- Works entirely in software — no hardware modification needed.
- AI-assisted execution planning for minimal circuit depth and latency.

Sample Safe FAQs for the Agent

Q: *What does this technology do in simple terms?*
A: It keeps quantum processors "in tune" while they run, so results are more accurate and circuits can run longer before errors creep in.

Q: *Does it require hardware changes?*
A: No — it's fully software-based and works with your existing QPU access.

Q: *Is this error correction?*
A: Not exactly — it's error suppression. Instead of fixing errors after they happen, it helps prevent them in the first place.

Q: *Will it work with my quantum platform?*
A: Most likely — it's hardware-agnostic and already works with multiple leading QPU providers.

Q: *Can it synchronize multiple quantum processors?*
A: Yes — it can align and maintain entanglement across devices without dedicated interconnects.