FAQs for Quantum-Classical Experiments and ED Skeptics

A compact guide for handling the predictable objections from people inside the standard-QM worldview.

0. For most questions and arguments:

Environmental decoherence shows how fast interference is destroyed.
The quantum–classical transition shows whether interference is possible at all.
Those are totally different questions.

1. "But decoherence explains the quantum–classical transition."

No — decoherence explains how fast coherence is destroyed, not whether coherence is possible.

Environmental decoherence is a **smooth erosion curve** caused by many tiny interactions with the environment.
The quantum–classical transition is a **structural boundary** determined by internal complexity.
These are different phenomena.

2. "We've already seen the middle ground — look at buckyballs."

No — we've only seen how buckyballs behave in dirty rooms.

Buckyball experiments measure:

- fringe visibility vs. environmental noise
- how fast interference fades

They do **not** measure:

- superposition capacity vs. internal complexity
- the structural limit of quantum behavior

The "middle ground" people talk about is just **partial environmental decoherence**, not a fundamental transition.

3. "Haroche filmed decoherence — isn't that the transition?"

No — Haroche measured the *rate* of coherence loss, not the boundary where coherence becomes impossible.

His experiment shows:

- a prepared quantum state
- gradually losing phase coherence
- due to cavity leakage

This is erosion, not a phase transition.

4. "Everything obeys the Schrödinger equation — why would complexity

matter?”

That assumption is exactly why the field never looked.

Standard QM assumes:

- electrons
- buckyballs
- viruses
- dust motes
- planets

…all obey the same equation.

So the field concluded:
“Everything is quantum. Classicality is just quantum + environment.”

Under that worldview, the question: “Can a system be too complex to be quantum?” **does not exist**.

ED introduces the missing axis.

5. “Why hasn’t anyone measured the ED transition if it’s real?”

Because the field assumed there was nothing to measure.

If you believe:

- everything is quantum
- classicality is just decoherence
- internal complexity never matters

…then you never build the experiment.

ED identifies the **unmeasured axis**: superposition capacity vs. internal event density

This axis has never been scanned.

6. “Why is environmental decoherence smooth?”

Because it’s caused by many tiny hits from the environment.

- thermal photons
- gas collisions
- blackbody radiation
- leakage

Each one removes a tiny bit of phase.

They add up smoothly.

Smooth = erosion.

7. “Why is the ED transition sharp?”

Because it’s a structural limit, not a decay.

Like:

- a bridge collapsing
- a string turning into spaghetti
- a crystal melting

Below the threshold → superposition possible
Above the threshold → superposition impossible

Sharp = boundary.

8. “Isn’t this just decoherence in disguise?”

No — decoherence is about the environment.

ED is about the system itself.

Two orthogonal axes:

- **Dirty room axis:** how fast coherence is damaged
- **Complex object axis:** whether coherence is possible at all

People confuse them because standard QM only has the first one.

9. “Why do people keep giving the same objections?”

Because they’re trained inside a worldview that only has one axis.

They’re not being insightful.
They’re being predictable.