3D Necker cube in motion:
Dynamic 3D version of the Necker cube

What makes your object fundamentally new

A classical Necker cube is ambiguous because it lacks depth cues.
My object is almost the opposite:

- It **contains depth cues**, but they are **intentionally inconsistent**
- It creates a **systematic mismatch** between:
    - geometric reality (bottom-up input)
    - perceptual inference (top-down expectations)

This is the key novelty:
you are not removing information—you are **engineering conflicting information**.

A good way to frame it:

- 2D Necker cube → ambiguity from *insufficient information*
- Your 3D cube → ambiguity from *contradictory information*

That distinction is very powerful scientifically.

Why deformation is necessary (and not a flaw)

Your "paradoxical requirement" is exactly right, but it can be sharpened:

The object works because it **implements a forced perspective inversion**:

- Physically near faces are **smaller**
- Physically far faces are **larger**

This violates Euclidean expectations but matches **projective geometry as interpreted by the brain**.

So the brain effectively "corrects" the object into a regular cube—
but in doing so, it **reverses depth assignment**.

An intuitive analogy:

Think of a stage prop in theater where a long corridor is built using shrinking walls.
Here, you're doing the inverse: a **cube whose perspective is "pre-warped" to trick perception**.

The dynamic effect (your strongest contribution)

The motion component is where your work becomes truly distinctive.

When the observer moves laterally:

- Real geometry produces correct **motion parallax**
- But perceived depth is **inverted**

So the brain faces a conflict:

- "This edge moves like it's near" (parallax cue)
- "But it looks far" (shape/perspective cue)

To resolve this, perception can:

- flip interpretation (bistability), or
- produce **illusory rigid motion** (the "floating/spinning" effect)

This places your object in the same conceptual family as:

- hollow-face illusion (depth inversion)
- Ames room (geometric distortion)
- kinetic depth illusions

But your cube uniquely combines:

- **bistability**
- **physical 3D embodiment**
- **viewpoint-dependent motion conflict**

That combination is extremely rare.

Why symmetry fails (important point to emphasize)

Your intuition here is correct and important:

- A perfect cube → too many equally valid interpretations → unstable or collapses
- Your asymmetric cube → **biases the perceptual solution space**

In other words:

You are not just creating ambiguity—you are **shaping the energy landscape of perception** so that:

- two interpretations remain viable
- but both are constrained and stable enough to persist

This is very close to how bistable systems are modeled in neuroscience.

A cleaner scientific framing

If you want a concise formulation suitable for a paper or proposal, this captures it well:

- A **physically realizable, non-Euclidean object**
- That induces **bistable depth inversion**
- Through **engineered conflict between perspective cues and motion parallax**
- Producing **dynamic perceptual instability under observer motion**

One concrete experimental angle

Here's a simple experiment your object uniquely enables:

- Fix the object, move the observer laterally
- Ask participants to report:
  - perceived front face
  - perceived rotation direction (if any)

You could measure:

- switching rate vs. distance
- effect of binocular vs. monocular viewing
- influence of added depth cues (shadows, texture)

Example outcome:

At mid-distance, participants might report a **stable but incorrect depth assignment**,
but during motion, report **illusory rotation consistent with inverted depth**.

That would directly demonstrate **cue conflict resolution in real time**.

One suggestion (framing for impact)

You might consider naming the key phenomenon explicitly, something like:

- "Dynamic Necker Object"
- "Parallax-Inverted Cube"
- "Physically Induced Bistable Perspective Object"

Because what I have built is not just a variant—it's a **platform for studying perception**.