

Stage 11 — v8 Plan: Well Sharpening

The objective of Stage 11 v8 is to deliberately sharpen the true well into a pointier structure, akin to toy models, while preserving the hard-won recall and phantom suppression of v7. This is framed as energy shaping, template sharpening, and topology tightening in the warped manifold.

Goals

- Maintain recall ≥ 0.95 and hallucination ≤ 0.26 .
- Preserve precision ≥ 0.80 .
- Increase curvature at the well minimum (sharper cone).
- Ensure margins ≥ 0 ; Phantom Index remains low (~ 0.03).
- Log new curvature/depth metrics for structural validation.

Sharpening Methods

- Potential shaping: subtract a soft-min near the true well and add a quadratic penalty to lift the floor.
- Confidence-focal weighting: scale acceptance by $w(Z)=Z^\beta$ to emphasize strong peaks.
- Prototype sharpening: use \sin^κ templates ($\kappa \approx 1.6$) or learn narrow atoms.
- Micro-warp reparameterization: compress time near the well center to make the basin pointier.
- PSD-aware CFAR tightening: raise thresholds slightly for off-center lobes while keeping detection generous.
- Low-rank + ZCA whitening: crisper minima, less cross-channel smear.
- Topology-preserving shrink: denoise with TV smoothing, then apply unsharp masking.

New Metrics to Track

- Curvature λ_1 : $-U''(t^*)$ near the minimum.
- Depth/Width ratio: basin depth relative to full-width half-max.
- Cone angle: slope at the well's FWHM.
- Maintain Phantom Index and Margins alongside these structural stats.

Safety Rails

- If recall < 0.92 , relax post-CFAR threshold (-0.5 dB) and reduce κ slightly.
- If precision < 0.78 or hallucination > 0.26 , tighten post-CFAR ($+0.5$ dB) or lower shaping strength.
- Do not allow Depth/Width to increase if Phantom Index rises > 0.01 (signals over-sharpening phantoms).

Stage 11 v8 represents the transition from stability to sharpness: engineering a single, deep, pointy well that mirrors toy-model clarity while safeguarding recall, precision, and phantom suppression. This phase cements the structural integrity of the Noetic Geodesic Framework.