Stage■11 | Step■2 Go/No■Go Gate — Denoise (Shadow Mode)

Use this gate after the shadow probe. Do not proceed to denoise shadow unless ALL red flags are cleared and ALL pass conditions are true.

Do NOT proceed if any of the following hold:

• Geometry / Phantom Detection

■ ■ Phantom Index (PI) > 0.10 — more than one peak remains in the funnel.

■ ■ Margin Norm < 0.04 — dominant well not clearly separated.

■ ■ K > 1 and margin does not improve after adaptive thresholds ($\tau \uparrow$, NMS $\uparrow$).

• Well Strength (Funnel Fit)

■ ■ S_median < 0.55 — warp/detect score too weak; basins not deep/steep.

■ ■ r_trend_tokens < 0.90 — inward trajectory over tokens is not consistent.

• Calibration & Signal Integrity

■ ■ Calibration < 300 on■topic prompts — funnel priors underfit.

■ ■ Pooling too shallow or inconsistent — last■k not swept across {8, 16, 24}.

■ ■ Model too small / flat — probe stuck at K=2 or S≈0.3 across taps after calibration/pooling.

■ ■ Detector unstable — PI, margin_norm, K oscillate with small param tweaks.

• Visual / Diagnostic Red Flags

■ ■ Calib density plot still shows two or more lobes.

■ ■ Debug print shows rmin ≈ rmax (collapsed radial span).

■ ■ Peak heights tied → margin_norm ≈ 0.

■ Proceed to Step■2 (denoise shadow) only if ALL are true:

■ ■ PI ≤ 0.10 (K = 1).

■ ■ margin_norm ≥ 0.04.

■ ■ S_median ≥ 0.55.

■ ■ r_trend_tokens → 0.90–1.00.

■ ■ Calibration ≥ 300 on■topic prompts.

■ ■ Density plots show a single dominant basin (no extra lobes).

■ ■ Last■k pooling swept and locked (k_last $\in$ {8, 16, 24}).

Minimal Metrics to Log (per run):

Metric	Symbol/Field	Go Threshold / Expectation

Phantom Index	PI	≤ 0.10
Dominance Margin (norm.)	margin_norm	≥ 0.04
Well Strength (median)	S_median	≥ 0.55
Inward Trend over tokens	r_trend_tokens	≥ 0.90
Peaks kept	K	== 1 (post■adapt thresholds/NMS)
Calibration size	calibration_prompts	≥ 300 (on■topic)
Pooling sweep	k_last	{8,16,24} swept & fixed

Suggested Log Schema (JSON):

```
{
"pi": 0.065,
"margin_norm": 0.044,
"S_median": 0.58,
"r_trend_tokens": 0.93,
"K": 1,
"calibration_prompts": 420,
"k_last": 16,
"dominant_basin": true,
"detector_unstable": false,
"dual_lobes": false,
"r_span_collapsed": false,
"margin_tied": false
}
```

One■liner Decision Rule:

GO iff (pi ≤ 0.10) ∧ (margin_norm ≥ 0.04) ∧ (S_median ≥ 0.55) ∧ (r_trend_tokens ≥ 0.90) ∧ (K = 1) ∧ (calibration_prompts ≥ 300) ∧ dominant_basin ∧ (k_last ∈ {8,16,24}). Else NO■GO.