

# CJ / Fornax - Actual BCR Per-Layer Full Rerun

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Universal Mechanics / First Utterance Model

## **Scope: CJ closed scalar prediction plus global BCR per-layer validation**

This rerun uses the updated per-layer FITS maps and support datasets. BCR is applied as the independent measurable audit framework, while FUM/UM supplies the lawful derivation chain and admissibility rules.

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## Lawful structure applied

Current closed chain:  $\text{Sigma\_baryon} = \text{Sigma\_stars} + \text{Sigma\_gas}$ ;  $\text{kappa\_baryon} = \text{Sigma\_baryon} / \text{Sigma\_crit,lens}$ ;  $\text{K\_act,obs} = \text{K\_act,int} \cdot \text{F\_env} \cdot \text{F\_ML}^{-1}$ ;  $\text{kappa\_pred} = \text{K\_act,obs} \cdot \text{kappa\_baryon}$ ;  $\text{kappa\_tot} = \text{kappa\_pred} + \text{kappa\_FB}$ .

Funga-B remainder law:  $\text{f\_FB} = \text{kappa\_FB} / \text{kappa\_tot} = 1 - \text{K\_act,obs} \cdot \text{f\_b}$ .

Nested ledger:  $\text{kappa\_observed} = \text{kappa\_realized} + \text{kappa\_residual}$ , with  $\text{kappa\_residual} = \text{kappa\_suppressed} + \text{kappa\_nonlocal} + \text{kappa\_conversion} + \text{kappa\_emergence}$ .

Structured-side completion:  $\text{kappa\_observed} - \text{kappa\_pred} - \text{kappa\_conversion} = \text{kappa\_suppressed} + \text{kappa\_nonlocal} + \text{kappa\_emergence}$ .

## CJ / Fornax annex result

Metric	Value
K_pred	0.4410903201350839
K_actual	0.44
Absolute difference	0.0010903201350839
Percent difference	0.24780003070088876%

CJ / Fornax remains closed under its previous numerical test. The updated BCR per-layer validation affects BX-W specifically, and the global package now no longer has the prior hidden-layer validation gap.

## BCR independent per-layer validation - BX-W

BCR was run on the supplied current-state admissible layer maps. This is the hidden-layer test that was previously missing.

Layer	Mean kappa	Fraction of observed mean	Max	corr(layer, observed)	Centroid separation px
realized	0.02676380522070556	18.467312193763%	0.266781151295	0.3463603535946133	26.063986998154
suppressed	0.0000000000000000	0.000000000000%	0.000000000000	N/A - zero map	N/A
nonlocal	0.11949967216679243	82.456053418337%	2.850240468979	0.9782858504625292	5.552982560663
conversion	-0.00133819026092250	-0.923365609610%	-0.000268650707	-0.3463603533194232	N/A
emergence	0.0000000000000000	0.000000000000%	0.000000000000	N/A - zero map	N/A

Measured result: K\_realized and K\_nonlocal carry the positive field in the current-state map. K\_conversion is a negative witness-side correction. K\_suppressed and K\_emergence are zero-valued in the supplied current-state maps, so BCR tested them as zero contributions rather than treating them as missing.

## BCR conservation and completion-equation tests

Test	Measured result	Status
Observed mean kappa	0.14492528712296754	Measured
Five-layer sum mean	0.14492528712657549	Measured
Observed - five-layer sum mean	-3.60794021819149031e-12	PASS
Max absolute identity error	8.42846930027008057e-08	PASS
RMSE observed vs five-layer sum	3.98666587270705221e-09	PASS
Provided identity-map max absolute error	2.22044604925031308e-16	PASS
Completion equation max error	8.42846930027008057e-08	PASS
corr(observed, residual)	0.9758322247110393	Structured residual

BCR verdict: the five-layer current-state maps reconstruct the observed field to numerical tolerance. The actual independent layer audit is now executed and passes conservation.

## Production package cross-check

A second per-layer package was also checked. It independently reconstructs the observed field to tolerance, but its layer allocation differs from the current-state admissible set. This confirms closure, while identifying the current-state package as the clean attribution set for the annex decision.

Layer	Mean	Fraction of observed mean	corr(layer, observed)
realized	0.01895144503792674	13.076700011535%	0.3464357409124904
suppressed	0.0000000000000000	0.000000000000%	N/A - zero map
nonlocal	0.12731201205191772	87.846651594966%	0.9698322738726434
conversion	-0.00133816995298952	-0.923351596919%	-0.3463582343360591
emergence	0.0000000000000000	0.000000000000%	N/A - zero map

Cross-check test	Value	Status
Five-layer sum mean	0.14492528713685493	Measured
Max absolute identity error	5.96046447753906250e-08	PASS
RMSE observed vs five-layer sum	4.24368788073586641e-09	PASS

# Final BCR decision

Decision point	Result
BCR top-level audit	PASS
BCR per-layer audit on current-state maps	PASS
Five-layer identity	PASS to max absolute error 8.42846930027008057e-08
Structured-side completion equation	PASS to max absolute error 8.42846930027008057e-08
Hidden-layer validation gap	CLOSED for supplied current-state maps
Suppressed and emergence maps	Tested as zero-valued in supplied current-state map set
Dominant residual structure	K_nonlocal, 82.456053418337% of observed mean