CORRECTION AND SCOPE

Separate Ward, Harmonic and Compact Tensor–Matter Checks

Original title · Full Compact Tensor Matter Ward-Square Audit Verdict

Separate Ward, harmonic and compact calculations test their respective targets. Including all specified variables in the screen leaves the simultaneous tensor–matter phase unresolved.

Manuscript · p. 1, verdict

Tower-Filtered ED Lanczos Scaling Audit for the Compact Ward-Square Spin-2 Box

Evidence · One-Hamiltonian composition requirements / Reduced finite-spin tower scaling

Full Compact Tensor/Matter Ward-Square Audit

Verdict: positive at the assembled full constrained harmonic-symbol level and positive as an ordered compact pilot screen. This is not a complete nonperturbative finite-d phase proof. It is the first check in this sequence where the full tensor/matter variables, the tensor quotient constraints, the covariant Ward-square, and a compact ordered-sector pilot are assembled in one model.

1. Model assembled

Variables per momentum: node 0 is the matter stress S_ij; nodes 1..W are synthetic tensor slices A_ij(s).

Stiffness: K(k) = L_path tensor I_6 + |d(k)|^2 I on the full symmetric-tensor path.

Constraints: div A_s = 0 and tr A_s = 0 for every synthetic slice, plus div(S-A_0)=0 and tr(S-A_0)=0 for the covariant relative tensor.

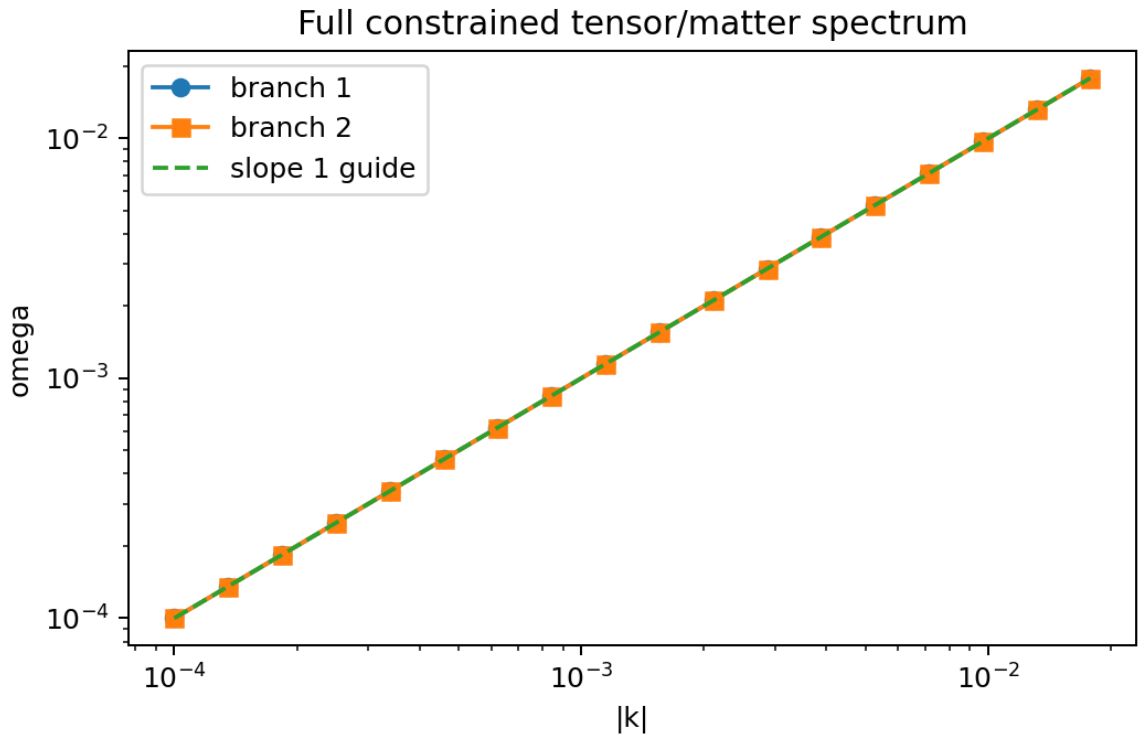
The covariant square is local before elimination. The nonlocal TT projection appears only after solving local constraints.

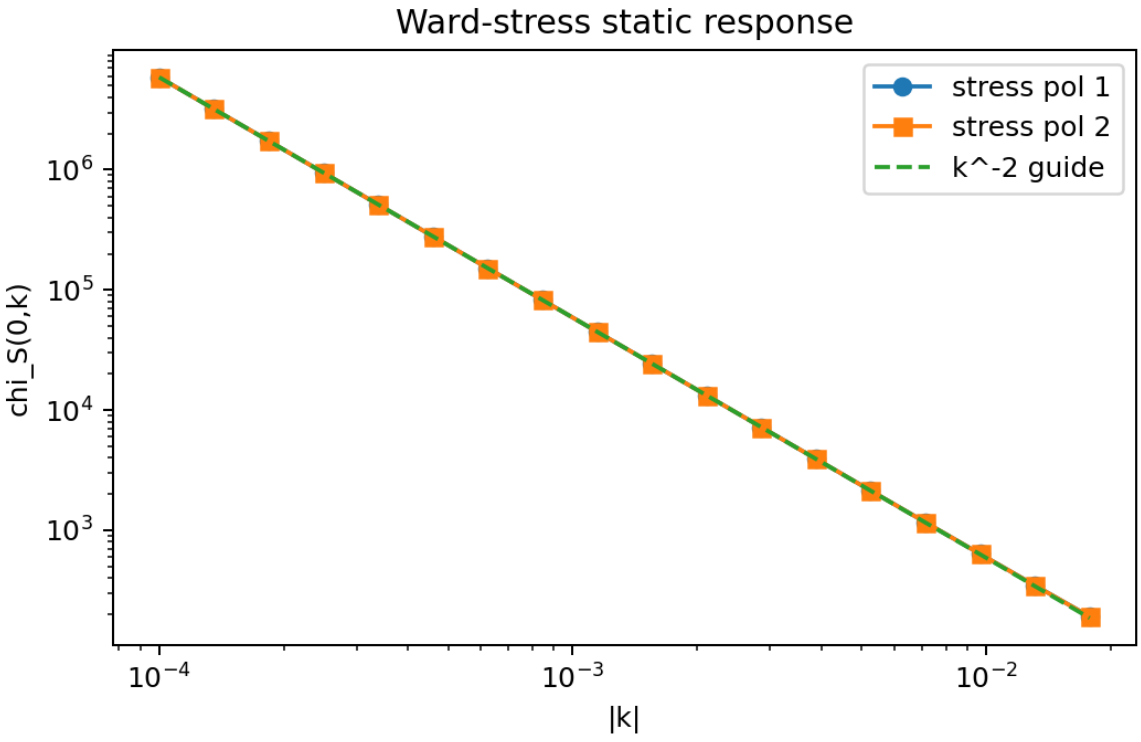
quantity	value
W	16
variables per momentum	102
constraint rows at nonzero k	68
constrained dimension	34
expected dimension 2W+2	34
max protected zero residual	0.000e+00

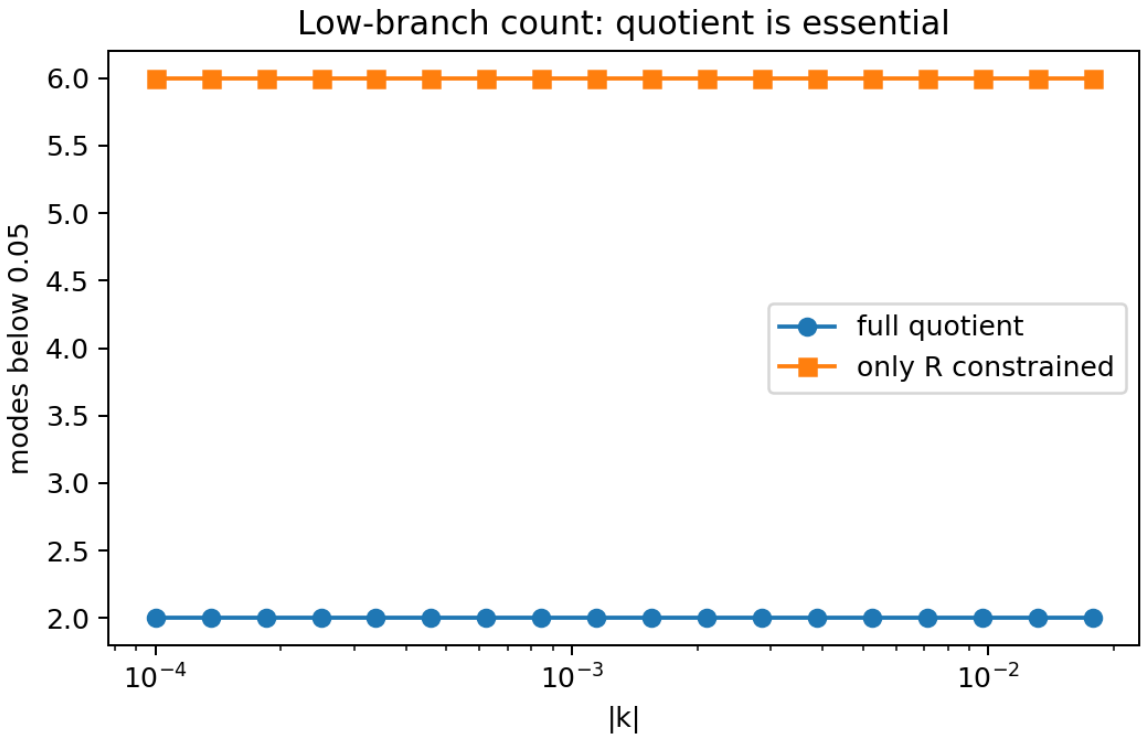
2. Spectrum and Ward response

The full constrained quotient gives two low branches with z1=0.999999525, z2=0.999999518. The static stress response fits chi_S ~ k^alpha with alpha1=-1.997024224, alpha2=-1.997024228. The third gap at the first IR point is 0.184536746.

The quotient is essential: if only the covariant R constraint is imposed and the tensor quotient is not imposed on the A slices, the same scan has six low tensor branches rather than two.


Full constrained tensor/matter spectrum
branch 1
branch 2
slope 1 guide
omega
|k|


Ward-stress static response
stress pol 1
stress pol 2
k^-2 guide
chi_S(0,k)
|k|


Low-branch count: quotient is essential
modes below 0.05
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
10^{-4}
10^{-3}
10^{-2}
|k|
full quotient
only R constrained

3. Finite-lattice rank checks

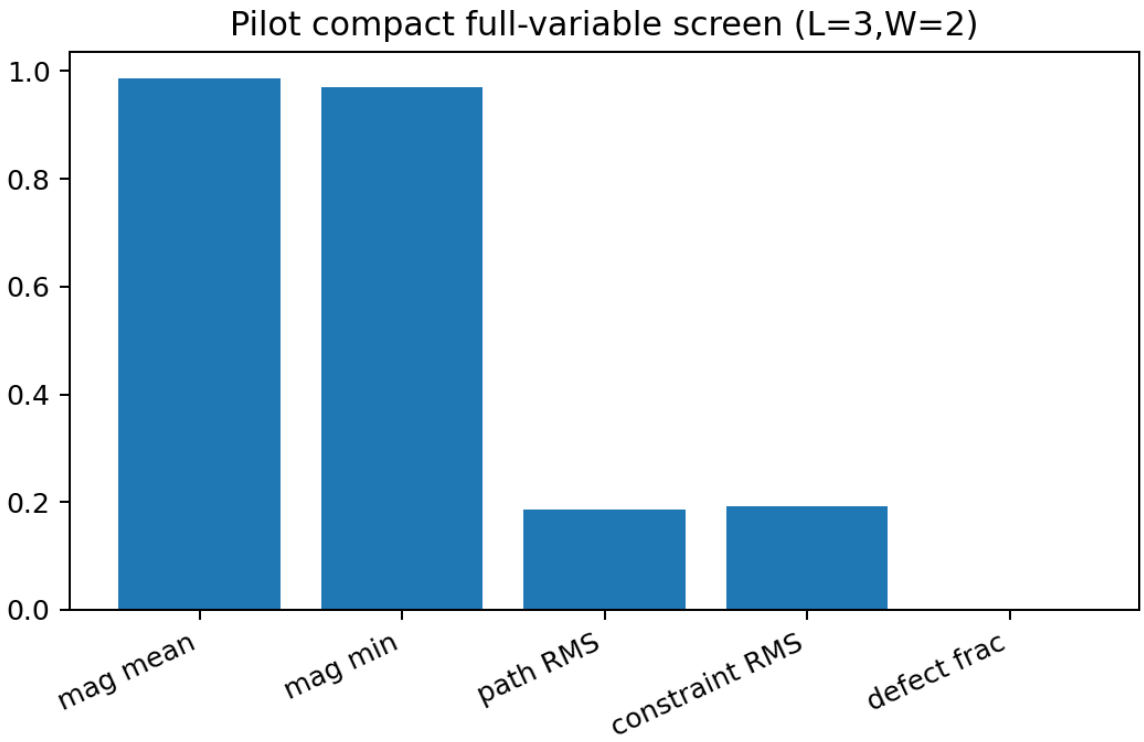
The local finite-lattice constraints obey the expected formulas rank C=(W+1)(4V-3) and dim ker C=(W+1)(2V+3).

L	W	V	rank	expected	dof	expected dof	match
2	2	8	87	87	57	57	True
2	4	8	145	145	95	95	True
3	2	27	315	315	171	171	True

4. Compact full-variable pilot screen

A small compact Metropolis pilot was run on the assembled variables. This is intentionally reported as a screen, not as a thermodynamic proof. It checks that the ordered compact sector and local constraint suppression coexist in the unfactored variable set.

metric	value
L,W	3,2
beta	1.2
J_path	8.0
kappa	20.0
acceptance	0.628182
mean |m|	0.985901
min |m|	0.970789
path-lock RMS	0.187089
constraint RMS	0.191536
defect fraction	0.000000



5. Boundary and next proof obligation

This audit closes the assembled harmonic-symbol version of the full compact tensor/matter Ward-square construction: the full quotient gives exactly two soft TT branches, the stress response has the desired k^-2 pole, and the local rank formulas match.

It does not yet prove the nonperturbative finite-d graviton phase. The remaining work is a larger lattice compact simulation with exact finite-spin flux variables, microscopic gauge-generator implementation of the constraints, and a direct dynamical spectral audit that verifies no extra Goldstone or mirror branch appears outside the harmonic quotient.