

# CED-007 — DIAGNOSTIC CARD

**Audit ID:** CED-007  
**Paper:** *Implications of the graviton one-loop effective action on the dynamics of the Universe*  
**Authors:** Janssen & Prokopec (2008)  
**Status:** Diagnostics declared, **not executed**  
**Role:** Inflation-adjacent quantum backreaction test  
**Baseline Comparison:** MB-2 (Slow-roll EFT), MB-3 (Starobinsky)

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## Run Validity Gate (RG) — PRE-CHECK

Gate	Requirement	Status
RG1	Model Card complete	✓
RG2	Translation Card complete	✓
RG3	Forbidden moves pre-screen	✓ (none detected at declaration level)
RG4	Diagnostic Card declared	✓
RG5	Null binding acknowledged	✓

**RG Status:** PASSED (authorization pending)

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## Diagnostics Requested

### D1 — Horizon Reconfiguration Null Test

**Requested:** ☐ Yes ☒ No

**Justification:**  
The model does **not** claim that horizon reconfiguration *alone* generates acceleration. Quantum loop structure is explicitly introduced. D1 is therefore **not the primary discriminator**.  
  
**Note:** D1 may be conditionally revisited if horizon dependence is promoted beyond bookkeeping during D2/D3.

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## D2 — Coarse-Graining Stability Test

Requested: ☒ Yes

Primary diagnostic for CED-007

Admissible variations to test (declared):

- Small variation of coarse-graining scale implicit in coincidence limits
- Alternative admissible vacuum/state choices (where discussed by authors)
- Modest relaxation of constant- $\epsilon$  assumption within perturbative control
- Reassignment of near-horizon modes consistent with stated slicing

Failure criteria (pre-declared):

- Order-unity change in effective  $w+1w + 1w+1$
- Loss or inversion of claimed screening/acceleration
- Emergence of dominant scheme-dependent terms
- Requirement of retuning to preserve effect

D2 Status: NOT RUN

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## D3 — Exchange-Term Provenance Test

Requested: ☒ Yes

Focus:

- Origin of effective stress–energy  $(T_{\mu\nu})_Q(T_{\{\mu\backslash\nu\}})_Q(T_{\mu\nu})_Q$
- Whether secular terms function as:
  - derived contributions, or

- implicit regulators controlling duration/outcome

**Key questions (pre-declared):**

- Are exchange terms strictly derived from loop structure?
- Is conservation closed without auxiliary assumptions?
- Do secular terms regulate inflation/ $\Lambda$  screening teleologically?

**D3 Status:** NOT RUN

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## **D4 — Predictive Wedge Test**

**Requested:** ☒ Yes (conditional)

**Trigger condition:**

D4 is applied **only if** the paper's claims survive D2 and D3 within the declared regime.

**Wedge sought:**

- Operational distinction from  $\Lambda$  + inflation beyond reinterpretation
- Constraint or exclusion not already present in EFT inflation
- Non-degenerate prediction surviving admissible reformulation

**D4 Status:** NOT RUN (conditional)

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## **Coupling & Scheme Diagnostics**

### **C1 — Coupling Provenance & Redundancy**

**Requested:** ☒ Yes

**Focus:**

- Whether loop-induced structures reduce functional freedom
- Whether secular dependence is equivalent to an implicit  $w(t)w(t)w(t)$

**C1 Status:** NOT RUN

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## S1 — Scheme / State Dependence Classification

**Requested:** ☒ Yes

**Expected classification space (no verdict yet):**

- S1-B (state-conditional but physical), or
- S1-D (scheme-fragile)

**S1 Status:** NOT RUN

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## Conditional Verdict Symmetry

**Enabled:** ☒ Yes

**Rule enforced:**

- Mechanism credit only within constant- $\epsilon$ , perturbatively controlled regime
  - Extrapolations to late-time attractors or global  $\Lambda$  screening audited **only if earned**
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## Ambiguity & Branching Declaration

**Known admissible ambiguities (pre-declared):**

- Vacuum/state selection
- Handling of near-pole behavior in digamma functions

- Interpretation of scalar field as fluid proxy vs active participant

**Branching rule:**

- If any ambiguity is both admissible **and** outcome-changing → branching required
  - Verdict defaults to **Ambiguous** if branches disagree
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## Diagnostic Integrity Statement

No diagnostics have been run.

No interpretation has been applied beyond faithful translation.

No verdict language is present.

This card declares **what will be tested, how, and under what constraints** — nothing more.