CEDA Model Card

Purpose:
This document records the **declared structure** of a proposed early-universe model *prior to any diagnostics*.
All entries must be explicit. **Omissions default to failure of the Run Validity Gate (RG).**

No diagnostic interpretation is permitted in this document.

---

0. Proposal Identification

- **Title:**
- **Authors:**
- **Year / Venue (arXiv / journal):**
- **Primary reference (link):**

---

1. Claimed Mechanism (Concise, Author-Stated)

In **1–3 sentences**, state exactly what the authors claim *causes* accelerated expansion, smoothing, or inflation-like behavior.

> Avoid interpretive language.
> State the mechanism **as the authors intend it to function physically**, not how it is often described secondarily.

---

2. Degrees of Freedom (DOF)

2.1 Explicit Dynamical DOF

List all fields, modes, or variables that enter the **action or equations of motion** as dynamical entities.

2.2 Effective / Collective DOF

List any coarse-grained, emergent, averaged, or expectation-value quantities treated as contributors to stress–energy or dynamics.

2.3 Fixed / Constrained Quantities

List quantities assumed fixed, frozen, externally specified, or constrained by hand (e.g., constant ε, imposed background, fixed equation of state).

---

3. System–Environment Partition

- **System (interior degrees of freedom):**
- **Environment (traced-out / inaccessible / external DOF):**
- **Boundary definition (horizon, cutoff, causal surface, none):**

State explicitly:

- whether any DOF are *traced out*,
- whether the partition **evolves in time**, and
- what physical principle enforces the partition.

If no partition is claimed, state **"closed system"** explicitly.

---

4. Conservation Accounting (RG-Critical)

4.1 Stress–Energy Structure

- **Stress–energy tensor(s) used:**

- **Origin (action-derived / effective / expectation value):**

4.2 Exchange-Term Status (Mandatory)

Declare **one and only one**:

- ☐ No exchange term QQQ; system is closed
- ☐ Explicit exchange term QQQ derived from partition evolution
- ☐ Effective / phenomenological exchange term (must be flagged for D3)

If **no exchange term** is claimed, explicitly state:

> "No exchange term is introduced or required; any effective-fluid representation is reducible to action-derived field equations."

4.3 Conservation Enforcement

- Where conservation is enforced (equations, identities, symmetries):
- Whether conservation holds exactly or only effectively / on average:

Failure to complete this section **fails RG**.

---

5. Horizon Use (if applicable)

- **Horizon definition (event / particle / apparent / effective / none):**
- **Role in the argument:**
    - ☐ bookkeeping only
    - ☐ constraint
    - ☐ dynamical (must be flagged)
- **Quantities explicitly dependent on horizon choice:**

If the horizon is claimed to be non-dynamical, state **how** it nevertheless enters the bookkeeping.

---

6. Coarse-Graining Prescription

- **Smoothing / cutoff scale(s):**
- **Justification for choice:**
- **Admissible variations (must be physical):**

If no admissible variation is specified, this will be flagged in **D2**.

---

7. Location of Negative Pressure / Acceleration

Identify **where the inflationary behavior physically resides**.

- **Equation number(s):**
- **Term(s) responsible:**
- **Physical source:**
    - ☐ dynamical DOF
    - ☐ constraint
    - ☐ geometric term
    - ☐ boundary / bookkeeping term

“Emerges from interpretation” is not an acceptable entry.

---

8. Model Scope Declaration (Framework vs Submodel)

This section prevents C1/D4 ambiguity.

Declare **one**:

- ☐ **Submodel:**
  Explicit functional forms / parameters are fixed and audited as a concrete mechanism.

- ☐ **Framework:**
  Claims apply only to generic properties across a class of models; mechanism-level credit requires additional restriction.

If **Framework** is selected, list:

- what is claimed to be generic,

- what is explicitly *not* claimed to be generic.

---

9. Known Fragilities / Author-Acknowledged Limits

List all caveats acknowledged by the authors, including but not limited to:

- regime restrictions (e.g., constant ε, slow variation),

- stability conditions (ghosts, gradients),

- EFT cutoffs / strong coupling,

- scheme, state, or vacuum dependence,

- need for resummation or nonperturbative control.

These declarations are **binding** in diagnostics.

---

10. Diagnostics Requested (Pre-Declared)

Check only diagnostics that are intended to be applied.

- ☐ **D1** — Horizon Reconfiguration Null

- ☐ **D2** — Coarse-Graining Stability
- ☐ **D3** — Exchange-Term Provenance
- ☐ **C1** — Coupling Provenance & Redundancy
- ☐ **S1** — Scheme / State Dependence Classification
- ☐ **D4** — Predictive Wedge

Unchecked diagnostics may not be invoked later.

End of Model Card