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Nāgārjunian Madhyamaka and relational quantum mechanics: the limits of relational foundationalism

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Abstract

Comparisons between Mahāyāna Buddhism and quantum physics often equate emptiness with indeterminacy, dependent arising with quantum relationality and entanglement with universal interconnection. Such equations conflate four levels: experimental results, mathematical formalism, interpretations of quantum theory and metaphysical extrapolations. Established quantum results significantly constrain selected classical ontological pictures but do not uniquely warrant relational foundationalism. Realist formulations of relational quantum mechanics (RQM) provide the strongest test case because, if independently motivated, they permit realism about physical facts without absolute quantum states. Recent work, however, remains divided over stable facts, cross-perspective links, composite observers, the occurrence of quantum events, non-interacting systems and observer persistence. Against this background, I reconstruct a Nāgārjuna-inspired critique of *svabhāva* as a symmetry test: dependence invoked to undermine self-sufficient objects must also be examined in the relations, events and structures proposed in their place. I call the resulting constraint meta-ontological restraint. Scientific success may warrant commitment to physical entities and relations without establishing them as ontologically independent or uniquely ultimate. The result is relational realism without relational foundationalism, and comparison without confirmation.

1. Introduction: beyond quantum Buddhism

The association of Buddhism with modern science did not arise from a neutral encounter between two independently constituted systems of knowledge. From the late nineteenth century, Buddhist reformers, scholars and Western interpreters presented Buddhism as unusually compatible with scientific rationality. Such claims helped Buddhist traditions negotiate colonial power, missionary criticism and the intellectual authority of European modernity. “Scientific Buddhism” was a historically situated discourse as well as a philosophical position (McMahan, 2004; Lopez, 2008).

Quantum theory acquired a privileged place within this discourse. Its challenge to classical particles, determinate trajectories and observer-independent properties encouraged comparisons with Mahāyāna accounts of emptiness and dependent arising. In popular and some academic writing, indeterminacy became *śūnyatā*, entanglement became universal interconnection and measurement became evidence that consciousness creates reality. Methodologically careful studies have resisted these equations (Barua, 2017). Mansfield (1990) warned against translating Madhyamaka directly into physical relativity. Bitbol (2003) treated Madhyamaka and quantum mechanics as distinct resources for challenging metaphysical reification instead of descriptions of a shared ontology. Peters (2022) linked Nāgārjuna with relational quantum mechanics, Friend (2024) examined whether ontic structural realism can answer a Madhyamaka objection to substantialist causation and Huang (2026) proposed a regulated comparison between Huayan Buddhism and the holographic principle. Hu (2026) has more recently brought Nāgārjuna into dialogue with Feyerabend on the authority and revisability of scientific method. Specialist work on Nāgārjuna also cautions against assuming one fixed constructive metaphysics:

Macor (2024) develops a strongly critical reading and Pulles (2025) argues for a deliberately flexible philosophical stance.

Taken together, these studies make a generic claim of convergence or anti-substantialism insufficiently novel. The remaining issue is methodological: comparative arguments can still pass too quickly from experimentally constrained claims to the ontologies built around them.

Quantum mechanics enjoys extraordinary empirical success, but that success does not select a single account of what exists. Its formalism has been embedded in interpretations involving particles guided by a wavefunction, a universally evolving quantum state, stochastic collapse processes, agent-relative probabilities and interaction-relative facts. Some approaches modify the dynamics or add variables, so talk of 'empirically equivalent interpretations' requires care. The relevant underdetermination is local, domain-sensitive and revisable, not a permanent equivalence among complete physical theories (Belousek, 2005; Egg & Saatsi, 2021; Wallace, 2023). Even so, evidence shared by serious rivals cannot be counted as uniquely supporting the distinctive metaphysics of one of them.

This article asks:

Which philosophically defensible relations can be established between the Madhyamaka critique of *svabhāva* and contemporary quantum ontologies once experimentally supported physics is distinguished from the metaphysical interpretations constructed upon it?

The answer defended here is deliberately limited. Madhyamaka supplies neither an interpretation of quantum mechanics nor a theory of measurement or the wavefunction. Quantum physics does not demonstrate emptiness or dependent arising. The comparison instead supports a conditional argument. First, where evidence common to serious rivals does not discriminate among their distinctive ontologies, a claim to unique metaphysical ultimacy requires further argument. Second, replacing objects with relations does not by itself provide that argument. Third, the Madhyamaka critique provides a test of symmetry: dependence used to challenge self-sufficient relata must also be asked of the relations and structures proposed to replace them.

RQM can support relational realism without thereby supporting relational foundationalism. I call the corresponding inferential constraint meta-ontological restraint. It is neither instrumentalism nor a prohibition on metaphysical inquiry. Ontological confidence should remain proportionate to the discriminatory force of the evidence, and any alleged foundation—object, event, relation or structure—must face the same questions about dependence.

The method is asymmetric and problem-oriented. Quantum theory and Madhyamaka are first reconstructed according to their own evidential and argumentative standards. Comparison begins only where a shared philosophical problem can be stated without translating one vocabulary into the other. The relevant test is functional, not lexical: which assumption does a concept reject, what explanatory work does it perform and within which domain does it apply? This procedure follows the methodological

caution developed in scholarship on “Eastern religions” and science while preserving the differences in purpose between empirical physics and Buddhist philosophy (Barua, 2017).

More specifically, the paper combines local quantum underdetermination with a Nāgārjuna-inspired symmetry test directed at relational foundationalism and the evolving ontology of RQM. This is narrower than Bitbol’s (2003) general warning against reification and avoids treating relationality itself as a shared ontology.

Sections 2 and 3 separate experimental constraints from the ontological plurality of quantum interpretations. Section 4 reconstructs *svabhāva*, dependent arising and emptiness without quantum vocabulary. Section 5 assesses the most common proposed parallels. Section 6 examines RQM, while Section 7 formulates meta-ontological restraint. The final section states the argument’s limits and implications.

2. What quantum physics establishes

General relativity and quantum field theory are each empirically successful within established domains, but no single accepted and comparably confirmed framework presently spans both regimes. The paper therefore makes no claim to a complete ontology of the universe. Its narrower question is what established quantum phenomena allow us to infer about physical reality.

That question requires a distinction between empirical constraints and the metaphysical accounts proposed to interpret them.

2.1 Interference and the limits of classical pictures

Talk of ‘wave–particle duality’ can suggest that a quantum entity alternates between two classical modes of being. Experiments support a different conclusion. Individual detections are localised, while their cumulative distribution can display interference. Tonomura et al. (1989), for example, recorded the gradual formation of an electron interference pattern from discrete events. Neither a classical particle following one determinate path nor a classical material wave provides a complete description of the phenomenon.

Whether interference survives depends on the physical availability of path information. The quantitative relation between path distinguishability and fringe visibility does not require a conscious observer (Englert, 1996). In quantum experiments, “observation” normally refers to physical interactions, records and correlations, not introspective awareness. Claims that consciousness creates physical reality often rest on an equivocation between measurement and human experience.

The resulting constraint is modest but consequential: classical categories remain indispensable to experimental description, yet they cannot be detached from their conditions of application and converted into a complete microscopic ontology.

2.2 Bell correlations and non-separability

Bell's theorem shows that quantum predictions are incompatible with the conjunction of assumptions required by Bell-local hidden-variable models (Bell, 1964). Loophole-free experiments support the predicted violations of Bell inequalities (Giustina et al., 2015; Hensen et al., 2015; Shalm et al., 2015). They do not refute every form of realism. They show instead that a viable account cannot preserve all the relevant classical assumptions at once.

Entanglement is a mathematically defined property of composite states. A pure composite state is entangled when it cannot be factorised into component states; a mixed state is entangled when it cannot be represented as a convex mixture of product states. This challenges a strong form of separability, but it does not imply that all things are directly connected, that spatial distinctions are unreal or that controllable information travels faster than light (Horodecki et al., 2009). The metaphysical significance of non-separability remains interpretation-dependent.

2.3 Contextuality

The Kochen–Specker theorem constrains attempts to assign definite values to all relevant observables in a way that is both noncontextual and consistent with quantum mechanics (Kochen & Specker, 1967). Spekkens (2005) extended contextuality to a broader operational framework. These results challenge the view that every measurement simply reveals a value already possessed independently of the relevant context.

Contextuality does not show that language or mental activity creates physical properties. Here 'context' refers to formally specified experimental procedures and relations of compatibility or operational equivalence. Contextuality provides a precise counterexample to one model of intrinsic value attribution, not a general proof that physical reality is conceptually constructed.

2.4 Decoherence and effective classicality

Interaction with an environment disperses phase relations into environmental correlations. Decoherence thereby suppresses locally observable interference between macroscopically distinguishable alternatives and helps explain why certain stable states behave approximately classically (Zurek, 2003; Schlosshauer, 2005). By itself, however, decoherence does not explain why one unique outcome occurs. A reduced density matrix may behave like a classical mixture for local purposes while the total state remains entangled.

Decoherence explains the emergence of effective classical stability, not an agreed outcome-selection mechanism. Everettian and relational interpretations embed decoherence in different ontological accounts, while objective-collapse theories modify the dynamics themselves.

2.5 What does not follow

The evidence excludes or constrains many classical pictures. It does not uniquely establish that reality consists of relations, information, consciousness, events or a universal wavefunction. Nor does it establish the Buddhist claims that phenomena lack *svabhāva* or arise through dependent designation. The gap between empirical constraint and ontological determination is not a licence for arbitrary speculation; it is where interpretations must supply further arguments.

3. From formalism to ontology

Quantum interpretations do more than attach rival narratives to an invariant formalism. They revise different components of the standard account and should be compared on their own terms.

Bohr's complementarity programme tied the meaningful use of classical concepts to experimental arrangements and resisted detached pictures of atomic objects with complete sets of properties (Bohr, 1928). This approach remains close to scientific practice, but it leaves open how a classically describable record arises if measuring devices are themselves quantum systems.

Bohmian mechanics supplements the wavefunction with definite particle configurations and a guiding dynamics (Bohm, 1952a, 1952b). It preserves continuous trajectories and determinism while accepting non-local dependence on the total configuration. Quantum theory therefore need not eliminate particles from ontology, although it rules out classical particles understood as locally self-contained substances.

Everett (1957) retained universal unitary evolution and dispensed with collapse. Measurement correlates systems, apparatuses and observers within an entangled state. Decoherence supports the emergence of quasi-classical branches, but Everettian accounts must still explain branching, probability and the ontological status of the universal state.

Objective-collapse theories modify the dynamics so that localisation becomes a genuine stochastic process (Ghirardi et al., 1986). Unlike interpretations that reproduce standard predictions exactly within a given domain, collapse models can in principle be tested against them. Their explicit account of outcomes comes at the cost of new constants and dynamics.

QBism treats quantum states as an agent's probability assignments, not as observer-independent physical objects. The Born rule constrains expectations, while collapse is an update following experience (Fuchs & Schack, 2013; Fuchs et al., 2014). QBism presupposes an external world but denies that the quantum state represents it from a view from nowhere.

Relational quantum mechanics (RQM) rejects absolute quantum states and absolute state-dependent values. Facts obtain relative to interacting physical systems; neither consciousness nor a classical apparatus is privileged (Rovelli, 1996). Later work has shifted emphasis from states to facts and events, using decoherence to distinguish relative facts from stable ones (Di Biagio & Rovelli, 2021, 2022).

This plurality supports only a limited underdetermination claim. Established experiments sharply constrain viable accounts but do not currently select one uncontested metaphysical ontology. The point

should not be overstated: objective-collapse theories may be experimentally distinguishable, and proposed interpretations differ in their treatment of quantum field theory, cosmology and gravity. Wallace (2023), for example, argues that broad claims of empirical equivalence overlook the incomplete status of non-Everettian extensions to interacting quantum field theory. The present argument relies on the weaker conclusion that familiar quantum phenomena do not by themselves establish a relational or Buddhist-compatible metaphysics.

4. Madhyamaka without quantum vocabulary

The analysis centres on arguments associated with Nāgārjuna's *Mūlamadhyamakakārikā* and does not claim to represent every Indian, Tibetan or East Asian development of Madhyamaka. It follows Siderits and Katsura (2013), Garfield (1994) and Westerhoff (2007, 2009), while retaining the ethical and soteriological setting emphasised by Stepien (2024). This is a philosophical reconstruction rather than a new philological interpretation. Competing readings of Nāgārjuna's method, the two truths and the status of positive philosophical claims remain live options and are treated below as constraints on what may safely be attributed to the historical author (Macor, 2024; Pulles, 2025).

The historical background also matters. The issue is not 'relationality' in the abstract. Abhidharma interlocutors could accept causal dependence while attributing *svabhāva* to fundamental dharmas; causal dependence alone therefore does not entail the Madhyamaka conclusion (Westerhoff, 2009, 2023). The argument reconstructed here concerns the additional move from dependent functioning to the denial of intrinsically constituted terms.

4.1 *Svabhāva*

Svabhāva is variously translated as intrinsic nature, own-being or inherent existence. Westerhoff (2007) distinguishes related uses involving defining essence, substantial independence and ultimate nature. In MMK 15.1–2, Nāgārjuna argues that a nature produced by causes and conditions would no longer be intrinsic: what is made is contingent on what makes it (Siderits & Katsura, 2013). The critique does not deny that objects have characteristics or that conventional distinctions work. It targets the stronger claim that an entity has its identity and existence independently of causes, parts, contrasts and conditions of identification.

Something possessing *svabhāva* would have to be what it is independently of relations that constitute or alter it. Yet phenomena arise, change and cease through conditions. The tension is not merely empirical. If an entity's defining nature were internally fixed and independent, it would be difficult to explain how causal interaction could produce genuine transformation.

4.2 Dependent arising

Dependent arising is not the proposition that everything is directly connected to everything else. Nāgārjuna opens the *Mūlamadhyamakakārikā* by rejecting production from self, from something wholly

other, from both or without cause. The argument targets attempts to construe cause and effect as intrinsically constituted terms whose identities are fixed independently of the causal relation itself (Siderits & Katsura, 2013).

Garfield's (1994) influential reading holds that emptiness enables causal efficacy instead of undermining it: if things possessed immutable intrinsic natures, production and change would be unintelligible. On the interpretive line adopted here, MMK 24.18 connects dependent arising, emptiness and dependent designation, while Chap. 24 treats emptiness as compatible with conventional functioning (Siderits & Katsura, 2013). The verse cannot bear this weight without qualification. Its syntax and philosophical implications are disputed: Oetke (2007) cautions against treating it as decisive evidence for any single reconstruction, Berger (2010) rejects a strong nominalist reading, Luó (2025) documents divergent commentarial schemes and Macor (2024) questions the constructive role commonly assigned to the two truths. The present argument therefore does not derive the symmetry test from MMK 24.18 alone. The inference from being caused to being empty is itself contested: Westerhoff (2023) shows that Abhidharma-inspired regularity accounts can resist parts of the Madhyamaka argument. The relation between causation and emptiness must be defended, not assumed.

Contemporary analytic Madhyamaka literature often distinguishes causal, mereological and conceptual dependence (Westerhoff, 2007; Bliss, 2026). Westerhoff traces the explicit tripartition to later Gelug commentarial traditions, so it should not be presented as Nāgārjuna's own three-part taxonomy. Causal dependence concerns causes and conditions, mereological dependence concerns wholes and parts and conceptual or designational dependence concerns the practices through which identities and kinds are distinguished. These dimensions interact without becoming interchangeable.

4.3 Emptiness and the two truths

On the reconstruction adopted here, *śūnyatā* names the absence of *svabhāva*. It is not an underlying field, cosmic consciousness or substance behind appearances. Within this reconstruction, MMK 24.18 is invoked only for the negative point that dependence does not disclose a hidden relational medium. Given the exegetical disputes surrounding the verse, no stronger thesis about a uniquely correct theory of designation is required for the argument.

Emptiness is itself empty. Were it treated as a self-existing ground, it would reproduce the form of reification it is meant to expose. This point distinguishes Madhyamaka from a simple replacement of objects by processes, relations or structures (Garfield, 1994; Westerhoff, 2009).

The familiar distinction between conventional and ultimate truth is likewise used cautiously. On the Siderits–Katsura and Westerhoff line followed here, conventional truth concerns dependently functioning phenomena and ultimate analysis does not uncover a more fundamental inventory beneath them (Siderits & Katsura, 2013; Westerhoff, 2009). Macor (2024), however, argues that the two truths do not play the philosophically constructive role often assigned to them in modern interpretation. The

present article need not settle that dispute. It requires only the weaker point that emptiness should not be reified as a second, self-existing domain behind conventional phenomena.

Conventional existence is neither intrinsic nor arbitrary. A table, disease or institution depends on material conditions, causal histories, organisation and practices of identification. Designation remains constrained by successful interaction with the world. The point needed here is modest: dependent functioning does not require ontologically independent existence. It does not settle whether Madhyamaka should itself be classified as a form of scientific or metaphysical realism (Westerhoff, 2009).

4.4 Anti-foundationalism with qualifications

Describing Madhyamaka as anti-foundationalist is useful but not innocent. Aitken (2021) develops a metaphysical indefinitist reading of the later Indian Mādhyamika Śrīgupta. Aitken (2024) argues that Nāgārjuna is committed to unrestricted causal and grounding versions of the principle of sufficient reason, whereas Bliss (2026) argues that anti-foundationalism alone does not settle whether Nāgārjuna's arguments in the *Mūlamadhyamakakārikā* validate that principle. Pulles (2025) cautions against locating Nāgārjuna in one fixed contemporary metaphysical position, while Macor (2024) presses an even more thoroughly critical reading. "Anti-foundationalism" is therefore used here as a limited analytic reconstruction, not as Nāgārjuna's own explicit metaphysical self-description. The symmetry test developed below is correspondingly Madhyamaka-inspired: it reconstructs one argumentative pressure generated by the critique of *svabhāva* rather than attributing a contemporary theory of grounding to Nāgārjuna.

This limited claim neither identifies Madhyamaka with contemporary coherentism or infinitism nor denies the legitimacy of scientific explanation. It challenges the passage from theoretical basicness to intrinsic metaphysical independence.

Svabhāva and fundamentality are not synonyms. A posit may be fundamental within a theory without being said to exist independently of all conditions, while a derivative entity may still be reified in ordinary thought. Nor is the claim that foundational posits literally ground themselves. The diagnostic proposed here targets the further inference from formal or explanatory primitiveness to status as an ontologically independent metaphysical ground. This narrower target avoids treating a Buddhist concept as a direct translation of a contemporary grounding relation.

5. Testing the alleged parallels

The comparisons below are evaluated by semantic role, epistemic level and scope rather than by lexical resemblance.

5.1 Complementarity and the two truths

Wave–particle complementarity concerns the contextual applicability of classical descriptions under mutually restrictive experimental arrangements. The two truths concern the conventional functioning and ultimate emptiness of phenomena. They are not alternative formulations of the same doctrine.

A limited analogy survives: both resist the demand that one unqualified description capture every legitimate aspect of a phenomenon. Their reasons differ. Complementarity responds to experimentally grounded restrictions on classical concepts; the two truths belong to a wider analysis of dependence, reification and liberation. A quantum object is not the Madhyamaka ultimate concealed behind wave and particle appearances.

5.2 Contextuality and dependent designation

Contextuality provides the most precise limited analogy. Quantum theory rules out a broad class of models in which values are assigned independently of measurement context. Madhyamaka challenges the more general claim that properties and identities are established independently of every condition of individuation.

Quantum context is formally specified and does not entail linguistic construction. Dependent designation includes conceptual and practical conditions alongside causal and mereological dependence. Contextuality therefore supplies a scientifically precise failure of one intrinsic-value model; it does not prove the Madhyamaka account of conventional identity.

5.3 Entanglement and dependent arising

Entanglement shows that the state of a composite system cannot always be reconstructed from separable assignments to its parts. It weakens a classical separability assumption but does not establish universal oneness, instantaneous communication or the disappearance of all distinctions.

Dependent arising has a wider causal, conceptual and soteriological scope. A phenomenon may depend on conditions without being entangled with each of them. Conversely, entanglement is not equivalent to the conditions through which a person, artefact or concept arises.

Contemporary physics nevertheless contains rigorously defined cases in which an independently complete description of components is unavailable. The same entanglement relation can be embedded in structuralist, monist or coherentist metaphysical frameworks, so the phenomenon does not select one ontology by itself (Pasqualini, 2026). Such cases challenge an intuitive picture of self-contained entities, but they neither demonstrate dependent arising nor turn the universe into one intrinsically existing whole.

5.4 Decoherence and conventional reality

Decoherence helps explain how environmentally robust quasi-classical patterns arise without postulating a separate classical dynamics (Zurek, 2003; Schlosshauer, 2005). On the reconstruction adopted here, Madhyamaka permits talk of conventionally effective phenomena without attributing *svabhāva* to them (Westerhoff, 2009).

The comparison is heuristic. Decoherence is a physical process in time, whereas conventional truth also encompasses language, knowledge, ethics and practice. A conventionally existent table is not merely an approximate representation of an ultimately real wavefunction. The shared point is only that dependence need not imply unreality.

5.5 Measurement and consciousness

No established result in quantum physics shows that consciousness creates reality. Interpretations assign different roles to measurement, agents and records. RQM does not privilege consciousness: in standard formulations, any physical system can in principle be the system relative to which a fact obtains; collapse theories dispense with observers; Everettian theories treat observers as quantum systems; and QBism gives agents an epistemic role without claiming that mind produces the external world.

Madhyamaka likewise denies intrinsic existence to both subject and object. Replacing an intrinsically existing material substance with an intrinsically existing consciousness would relocate reification, not overcome it.

These limited analogies are critical rather than constructive: quantum physics and Madhyamaka each undermine selected forms of naïve substantialism, but they do not converge on a single positive ontology.

6. Relational quantum mechanics as a test case

RQM is the most promising test case because it concerns a specific interpretation, not a general appeal to quantum non-classicality. Its minimal claim is that quantum states and state-dependent values need not be absolute. In orthodox formulations, definite values are said to obtain relative to systems in quantum events associated with interactions, while different systems may legitimately use different state descriptions (Rovelli, 1996). The exact condition under which an interaction constitutes such an event is disputed and is considered below.

The scope of this relationality must be stated precisely. RQM principally concerns state-dependent properties; it need not hold that every property or every condition of system identity is relational. Dorato and Morganti (2022) caution against moving directly from Rovelli's emphasis on interaction to the stronger claim that reality is wholly analysable in relational terms. Fano and Sanchioni (2025), by contrast, construct a realist ontology of relational properties from RQM's postulates while explicitly retaining relata rather than adopting the stronger structuralist thesis that relations can exist independently of them. These alternatives narrow the comparison with Madhyamaka without removing it.

A terminological trap should also be avoided. Some formulations of orthodox RQM describe the relation between two systems as "intrinsic" in the restricted sense that it does not depend on facts outside those systems (Ladyman & Thompson, 2026). This is not the same notion as *svabhāva*. The comparison

developed here concerns ontological and constitutive independence, not every technical use of the word “intrinsic”.

In realist formulations of RQM, this relationality is not subjectivist. A detector, atom or other physical system can be the system relative to which a fact obtains. RQM therefore challenges the assumption that every real state-dependent property must be possessed absolutely; it does not by itself determine the metaphysical status of relations or relata.

6.1 Facts, states and stability

Di Biagio and Rovelli (2022) emphasise that RQM concerns facts rather than states. The quantum state is used to calculate probabilities of events relative to a system; it is not an absolute object containing every fact. Their earlier distinction between relative and stable facts uses decoherence to explain why the relativity of many macroscopic records can be ignored in practice (Di Biagio & Rovelli, 2021).

Adlam and Rovelli (2023) introduced cross-perspective links to make information recorded in one physical system accessible to others. The proposal addresses intersubjective access but differs substantially from orthodox RQM. Robson (2024) uses the consistent-histories framework to clarify stable facts and sketches an alternative route to the cross-perspective-links proposal. Adlam (2026) treats RQM + CPL as a more moderate form of relationality, while Luc and Placek (2025) argue that the two versions differ over agreement, probability and dynamics. RQM now names an evolving family of proposals, not a settled metaphysical package.

The definition of the relata is itself contested. Riedel (2025) formulates a combination problem concerning the relation between facts relative to composite observers and facts relative to their constituents. Terris (2026) argues that mere physical interaction does not yet explain the persistence and informational coherence required of an observer across successive measurements. These disputes matter for the present comparison because they show that neither ‘system’ nor ‘observer’ can simply be assumed to be an intrinsically individuated term of the relation.

Recent criticism targets a more basic point: when does an interaction count as producing a quantum event? Faglia (2025) and Ladyman and Thompson (2026) argue that existing formulations do not specify this with enough precision, especially for weak or continuous interactions, and conclude that the measurement problem remains unresolved. Whether that criticism is decisive remains open. For present purposes, the challenge matters independently of its final resolution: ‘interaction’ cannot be treated as an ontologically transparent primitive merely because relational facts are said to arise through it.

The distinction between relative and stable facts bears a limited resemblance to conventional truth. Stable facts can be reliable, communicable and causally effective without becoming absolute. Yet stability and conventionality are not equivalent, nor are relative facts a form of ultimate truth. Madhyamaka does not divide reality into a quantum relative level and a classical conventional level.

6.2 Is a relational ontology enough?

The Madhyamaka challenge begins where RQM's minimal physical claim ends. RQM itself is not being criticised here, still less every metaphysical interpretation of it. If events, relations or structures are subsequently treated as fundamental and ontologically independent constituents, however, an anti-substantialist ontology may reproduce intrinsic foundation at a new level. The question is what additional argument fixes the status of relations, relata and structures rather than merely assigning them a useful role in the interpretation.

Friend (2024) argues that ontic structural realism can answer important Madhyamaka objections to substantialist causation by assigning priority to modal structure instead of independently constituted objects. This is a genuine advance over simple substance metaphysics, but it does not automatically satisfy the Madhyamaka critique. The following inference is invalid:

relations are prior to objects, therefore relations lack intrinsic nature

A structure can inherit the role of an independent foundation previously assigned to substance.

Dorato and Morganti (2022) propose metaphysical coherentism for RQM, allowing systems and qualitative profiles to stand in symmetric relations of dependence. Jaura (2024) argues that their version remains foundationalist because symmetrically dependent physical systems are still treated as fundamental, and develops an explicitly anti-foundationalist coherentism instead. Fano et al. (2026b) propose relational unsharp properties for non-interacting systems, preserving RQM's relational core while offering an entity-realist account of systems before sharp measurement. A companion analysis extends RQM to generalised measurements by identifying relational events with the effects represented by positive operator-valued measures (Fano et al., 2026a). Taken together, these positions show that RQM does not entail relational foundationalism; Jaura's proposal further argues that it can motivate an anti-foundationalist alternative.

The symmetry test nevertheless discriminates among metaphysical extensions in a non-trivial way. An OSR reading that gives modal structure ontological priority must explain why the dependence used against intrinsically constituted objects stops at structure. On Jaura's (2024) reading, Dorato and Morganti's coherentism still faces the question of how symmetrically dependent systems can remain fundamental despite lacking ontological independence. Jaura's anti-foundationalist coherentism passes this first-stage challenge more readily because it posits no fundamentalia, but it is still not thereby Madhyamaka: symmetric dependence remains a positive contemporary metaphysical model whose own primitives and scope require defence. A relational-property ontology that retains relata, such as Fano and Sanchioni's, is not rejected merely for doing so; the question is instead how both relata and relational properties are individuated and whether either is granted ontologically independent status.

The recent literature distinguishes several models of relationality and intersubjectivity: orthodox relative facts, stable-fact accounts, RQM + CPL, coherentism, relational-property ontologies, unsharp relational properties, a generalised-measurement formulation and soft perspectivism (Robson, 2024; Calosi & Riedel, 2024; Fano & Sanchioni, 2025; Luc & Placek, 2025; Adlam, 2026; Covoni et al., 2026; Fano et al.,

2026a, b). Critiques of the event-generating notion of interaction add another fault line (Faglia, 2025; Ladyman & Thompson, 2026). The disagreements concern intersubjectivity, system composition, non-interacting systems, observer persistence, the conditions for quantum events, measurement theory, dynamics and the status of cross-perspective links. A comparison with Madhyamaka must not treat these as one ontology.

Madhyamaka cannot resolve these technical disputes. It supplies no consistency condition for Wigner's-friend experiments and no substitute for the quantum formalism. Its role here is diagnostic: it asks whether an interpretation has inferred intrinsic independence from theoretical or explanatory priority.

The strongest point of contact is conditional. If RQM is favoured on independent physical and explanatory grounds, it illustrates how realism need not require absolute state-dependent properties. The Nāgārjuna-inspired symmetry test then blocks a further inference from that result alone to the intrinsic priority of relations. The result is relational realism without relational foundationalism unless an independent argument for the latter is supplied.

7. Meta-ontological restraint

Meta-ontological restraint is best understood as a defeasible rule governing inference from physical theory to metaphysical ultimacy. It leaves open whether fundamental entities exist and instead governs what may be inferred from empirical and explanatory success without further metaphysical argument.

7.1 The argument

The argument has four premises.

First, within overlapping empirical domains, established quantum evidence does not by itself discriminate between serious rival interpretations with respect to all of their distinctive metaphysical commitments. This claim is local and domain-sensitive: it neither assumes permanent empirical equivalence nor denies that future theory and experiment may discriminate between rivals.

Second, evidence common to rival approaches cannot, without further argument, uniquely warrant the metaphysical commitments that distinguish one of them. Inference to the best explanation may provide that further argument, but its explanatory criteria and background assumptions must be made explicit and not presented as experimental results.

Third, the priority of relations over objects does not entail that relations possess independent foundational status. Anti-substantialism is weaker than anti-foundationalism. A structure may replace substances while retaining their former explanatory role.

Fourth, the Nāgārjuna-inspired reconstruction supplies a symmetry test. When dependence on causes, parts, relata or conditions of identification is used to deny intrinsic independence to objects, the same

forms of dependence must be considered for the relations and structures introduced in their place. Exemption requires an argument; relational vocabulary alone is insufficient.

If RQM is adopted on independent physical and explanatory grounds, it may justify realism about relative facts without justifying relational foundationalism. The conclusion is conditional, not eliminative: a relational foundationalist may still succeed, but not by borrowing the empirical success of quantum mechanics without an additional metaphysical case.

7.2 Relation to neighbouring positions

This proposal overlaps with work on quantum underdetermination and non-fundamental ontology. Egg (2021) argues that quantum mechanics supports substantive but non-fundamental ontological commitment without speculative completion. Egg and Saatsi (2021) survey the underdetermination challenge, while Saatsi (2022) questions whether effective realism becomes ontologically too permissive. Meta-ontological restraint does not select a neutral textbook ontology or identify the appropriate scale of commitment. It is an inferential constraint: whatever ontology is adopted, theoretical success does not by itself establish ontological independence or unique ultimacy.

The proposal also differs from the soft perspectivism attributed to RQM by Covoni et al. (2026). It does not offer a general account of scientific knowledge or objectivity across perspectives. Its narrower target is the transition from a relational description to relational foundationalism. Nor is it metaphysical quietism. Competing ontologies may be assessed by coherence, explanatory scope, compatibility with relativity, treatment of probability and prospects for empirical extension.

7.3 Four constraints on ontological inference

The first constraint is epistemic separation. Experimental results, formalism, physical interpretation and metaphysical ontology must remain distinguishable. Violations of Bell inequalities constrain Bell-local hidden-variable models; they do not independently confirm RQM, structural realism or Madhyamaka.

The second is inferential proportionality. Ontological confidence should track the discriminatory power of the evidence and the strength of any independent explanatory argument. Revisability is therefore not a sign of unreality but a condition of responsible scientific realism.

The third is symmetry of dependence. If objects are denied intrinsic independence because they depend on relations or structures, those relations and structures cannot be treated as exempt by default. The test does not assume that everything depends in the same way; it requires the relevant differences to be shown.

The fourth is robustness without ultimacy. Detectability, causal efficacy and explanatory indispensability do not require uniquely ultimate existence. This claim does not derive scientific realism from Madhyamaka. A realist interpretation of RQM and ordinary scientific practice supply the commitment to physical reality; Madhyamaka constrains the further inference to intrinsic foundation.

7.4 Objections and replies

A scientific metaphysician may reply that metaphysical choice is rarely determined by experiment alone. Meta-ontological restraint is compatible with that point: it requires independent metaphysical considerations to be identified and defended rather than presented as consequences of a shared formal success.

A second objection concerns the relation between *svabhāva* and fundamentality. They do not map neatly onto one another, and Westerhoff (2007) distinguishes definitional, substantial and ultimate senses of *svabhāva*. The present argument therefore does not equate every primitive posit with intrinsic nature. It applies when primitiveness is expanded into independence from causes, relations, individuation or any explanatory context. The target is ontological independence from the relevant causes, relations and conditions of individuation, not fundamentality in every technical sense.

A third objection is that Madhyamaka cannot support the relational realism proposed here because its own conventional ontology is disputed. Because the paper does not derive its realism from Madhyamaka, that dispute limits the comparison without undermining the conditional argument. The realism comes from the physical interpretation and ordinary scientific commitment; within this article, the Nāgārjuna-inspired reconstruction contributes the symmetry test. The paper does not claim that Nāgārjuna endorsed scientific realism or that conventional truth maps onto an effective physical ontology.

A fourth objection is that the paper abstracts Madhyamaka from its soteriological setting. The critique of reification is connected to ignorance, attachment, ethical transformation and liberation, whereas quantum ontology is not (Stepien, 2024). The abstraction is legitimate only as a limited reconstruction of one argumentative function. It would become illegitimate if it attributed physical conclusions to Nāgārjuna or treated the soteriological setting as dispensable.

A fifth objection is that the symmetry test is merely a generic demand for consistency and adds nothing specifically Madhyamaka. It is not offered as a uniquely Buddhist logical rule. Its Madhyamaka provenance lies in a more specific argumentative pattern: dependence is used to resist the attribution of *svabhāva*, and that resistance cannot simply be halted at a favoured relational category by stipulation. The contribution of this article is not the abstract maxim ‘be consistent’, but the application of this anti-reification pressure to distinct metaphysical extensions of RQM under conditions of local underdetermination. If an independent argument establishes relational fundamentality, the test is satisfied rather than refuted.

RQM’s continuing development might seem to make it a poor test case, yet it also makes the inferential problem unusually visible. As stable facts, cross-perspective links, composite observers, generalised measurements and unsharp properties are introduced, new commitments are motivated by demands for realism, empirical adequacy and intersubjective confirmation. Madhyamaka cannot resolve their

technical merits, but it can expose the point at which a motivated addition is redescribed as the intrinsic structure of reality.

8. Conclusion: comparison without confirmation

Quantum theory places stringent constraints on classical pictures of independently existing objects with complete, context-independent properties. Those constraints are experimentally grounded and metaphysically significant, but they do not establish a uniquely relational, informational or Buddhist ontology. Bohmian, Everettian, collapse, QBist and relational approaches assign different roles to particles, states, events, probabilities and interactions. Their evidential relations must be assessed domain by domain instead of being presumed permanently equivalent.

Madhyamaka contributes no rival physics. Its relevance lies in questioning the passage from dependence to intrinsic foundation. Emptiness is not a quantum field, dependent arising is not entanglement and the two truths are not wave and particle descriptions. The analogies that survive concern the failure of selected context-free or separability assumptions, not the confirmation of one tradition by the other.

Realist formulations of RQM provide the strongest test because, if viable, they permit realism without absolute state-dependent properties. Recent work also shows why ‘RQM’ cannot be treated as a single completed ontology: versions differ over stable facts, cross-perspective links, composite observers, non-interacting systems, relational properties and observer persistence. Some develop anti-foundationalist commitments; others give priority to events, relational properties, structure or coherent dependence. This plurality makes it especially important to distinguish relational realism from relational foundationalism.

Meta-ontological restraint captures the resulting inference. Where established evidence does not discriminate between serious rivals with respect to their distinctive metaphysical commitments, those commitments require an independent defence. When relations replace objects, the dependence analysis applied to the latter must also be applied to the former. A successful interpretation may justify realist commitment to physical entities and relations without thereby establishing either as the final self-sufficient basis of reality.

A defensible dialogue between Madhyamaka and quantum theory therefore remains critical rather than confirmatory. Physics constrains the physical descriptions that remain viable; the Nāgārjuna-inspired test asks whether a subsequent move to intrinsic foundation applies the same dependence analysis consistently. This separates three issues that should not be conflated: empirical constraint, relational realism and the additional metaphysical case required for relational foundationalism.

Declarations

Use of generative AI and AI-assisted technologies

During the preparation of this manuscript, the author used OpenAI's ChatGPT to assist with language and editorial revision, bibliographic organisation and layout consistency checks. The author wrote, reviewed, verified and revised all material and accepts full responsibility for the final text, references and conclusions.

Author Contribution

I am the only author.

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