

Three Tales of Relational Quantum Mechanics: Relativist, Absolutist, and Fictionalist Approaches*

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Relational Quantum Mechanics (RQM) is an interpretation of quantum mechanics according to which determinate values of physical variables obtain only relative to other physical systems. In recent literature, two distinct ways of understanding RQM have been discussed: *Relative RQM* and *Absolute RQM*. These two versions of RQM differ in how they respond to the Agreement Question, which asks whether observer-relativity in RQM persists even after observers undergo cross-checking interactions. Relative RQM holds that observer-relativity persists, while Absolute RQM holds that any such cross-checking interaction must result in genuine—as opposed to apparent—agreement. In this paper, I first discuss these two versions of RQM, highlighting their respective limitations. I then propose a third approach—a fictionalist one—on which the Agreement Question is not even a legitimate question. On this view, RQM is motivated by what I call perspectival fiction. I argue that while certain cross-perspectival descriptions of physical systems are permitted within the fiction, those involving two or more non-unitary processes—precisely the kind required to answer the Agreement Question—are not. While I do not advocate the fictionalist approach as the uniquely correct way of understanding RQM, I propose that it is an option worthy of further exploration.

Keywords: Relational Quantum Mechanics, Relativism, Fictionalism, Perspectival Fiction

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1. Introduction

Relational Quantum Mechanics (RQM) is a relatively recent interpretation of quantum mechanics, proposed by Carlo Rovelli (1996) and refined in a growing body of subsequent literature.¹⁾ RQM is driven by the diagnosis that the principal source of the “unease” with quantum mechanics is, at least in part, the classical assumption that physical systems have observer-independent quantum states and physical quantities take observer-independent values.²⁾ The view seeks to mitigate the unease by abandoning this assumption and treating quantum states and state-dependent properties as meaningful only relative to some other physical system.

In recent literature, some distinct ways of construing RQM have been suggested.³⁾ I suggest that one can distinguish different versions of RQM depending on how they respond to what I call the *Agreement Question*, which asks whether intersubjective agreement is secured in RQM, i.e., whether cross-checking interactions between observers could dissolve the observer-relativity posited by RQM.

On one version of RQM, which I will call *RRQM* (‘Relative RQM’) following Faglia (2025), even when two observers perform independent measurements and later interact for cross-checking, there can be no non-relative fact about what actually occurred in their measurements

1) See, among others, van Fraassen (2010), Rovelli (2018), Ruyant (2018), Laudisa (2019), Adlam (2022), Adlam and Rovelli (2023), Riedel (2024), Faglia (2025), and Jacobs and Read (2025).

2) Rovelli (1996), p. 1639.

3) This distinction is most clearly presented in Jacobs and Read (2025) and Faglia (2025). Jacobs and Read distinguish three versions of RQM in the literature: Absolute RQM, Relative RQM, and Adlam’s (2026) Dynamical RQM. I will not discuss Dynamical RQM as a separate version of RQM, however, since Adlam herself presents it as an alteration of Absolute RQM.

beyond each observer's internally consistent experience. Arguably, Rovelli's (1996) original presentation of RQM can be identified with this reading.⁴⁾

A second approach to RQM is motivated by concerns about usual scientific confirmation based on intersubjective agreement. Adlam and Rovelli (2023) propose what I call *ARQM* ('Absolute RQM') following Faglia (2025), on which robust intersubjectivity is stipulated in a restricted sense: if one observer measures the physical variables encoding another observer's outcome, the results of these two observers *must* match in an objective sense.

After critically examining RRQM and ARQM, I propose a third way of understanding RQM, *FRQM* ('Fictional RQM'), which is indirectly inspired by van Fraassen's (2010) exposition of RQM. FRQM draws attention to the fact that the standard thought-experiments used to motivate RQM adopt a viewpoint that juxtaposes mutually inaccessible perspectives that is nomologically impossible on RQM's own terms. FRQM takes these narratives as a form of fiction—*perspectival fiction*, in particular. On FRQM, comparing multiple perspectives is legitimate within a perspectival fiction and can serve to motivate RQM. However, the Agreement Question, or any question that demands one to jointly consider two or more non-unitary processes, is not legitimate even within the fiction. As a result, FRQM offers a deflationist response to the Agreement Question: it is not even a legitimate question within the RQM-fiction. By presenting FRQM, I do not intend to defend it as correct or more promising than the other versions of RQM. My aim is to show that it offers a viable new option for the proponents of RQM that deserves further exploration.

To this end, in Section 2, I will introduce and motivate RQM, and formulate the Agreement Question. In Sections 3 and 4, I will discuss

4) See Ruyant (2018), p. 441; Jacobs and Read (2025), p. 7.

RRQM and ARQM, respectively. In Section 5, I will propose and develop the fictionalist approach to RQM.

2. RQM and the Agreement Question

In its recent presentations (Di Biagio and Rovelli 2022; Adlam and Rovelli 2023), RQM is characterized as having the following postulates:⁵⁾

(R1) **Relative Facts:** Events, or facts, can happen relative to any physical system.

(R2) **No hidden variables:** Unitary quantum mechanics is complete.

(R3) **Intrinsic Relations:** The relation between any two systems A and B is independent of anything that happens outside of these systems' perspectives.

(R4) **Relativity of Comparisons:** It is meaningless to compare the accounts relative to any two systems except by invoking a third system relative to which the comparison is made.

(R5) **Measurement:** An interaction between two systems results in a correlation within the interactions between these two systems and a third one; that is, with respect to a third system W , the interaction between the two systems S and F is described by a unitary evolution that potentially entangles the quantum states of S and F .

(R6) **Internally Consistent Descriptions:** In a scenario where F measures S , and W also measures S in the same basis, and W then interacts with F to “check the reading” of a pointer variable (i.e., by measuring F in the appropriate “pointer basis”), the two values found are in agreement.

⁵⁾ This particular formulation of the postulates is adopted from Adlam and Rovelli (2023, p. 3), with labels modified for easier reference.

Of these postulates, **(R1)** captures the main tenet of RQM, which takes quantum mechanics “as a theory about the states of systems and values of physical quantities relative to other systems.”⁶⁾ This relative nature of physical descriptions is often illustrated and motivated by a thought experiment called *Wigner’s Friend*, which involves two observers asymmetrically situated with respect to some quantum system.⁷⁾ Consider a quantum system S (e.g., an electron) inside a closed laboratory isolated from any outside observer at time t_0 , prepared in a superposition of the eigenstates $|o_1\rangle, |o_2\rangle, \dots, |o_n\rangle$ of some observable O , given by

$$|\Psi(t_0)\rangle_S = \sum_{i=1}^n c_i |o_i\rangle, \quad (2.1)$$

for some non-zero normalization coefficients c_i satisfying $\sum_{i=1}^n |c_i|^2 = 1$. At a later moment t_1 , Alice, who is also inside the laboratory, measures O on S , and obtains a definite eigenvalue of O , say, o_1 —where $O|o_i\rangle = o_i|o_i\rangle$ —as the outcome of her measurement. So, she records

$$|\Psi(t_1)\rangle_S = |o_1\rangle. \quad (2.2)$$

6) Rovelli (1996), p. 1648. Although I will routinely talk in terms of ‘states’ in what follows, this is primarily for expository convenience. Ontologically, RQM is supposed to be read as a view about relative events or facts, which obtain only at interactions, rather than as a view about quantum states.

7) This thought experiment originates from Wigner (1967) and is often referred to as the *third-person problem*. See Rovelli (1996), Laudisa (2019), and Weststeijn (2021) for slightly different presentations of the thought experiment.

Meanwhile, another observer, Bob, is outside of the laboratory, with the knowledge of the initial states of Alice and S at t_0 . Accordingly, Bob describes the state of the composite system $Alice+S$ at t_0 by

$$|\Psi(t_0)\rangle_{Alice+S} = |Alice_{ready}\rangle \otimes \sum_{i=1}^n c_i |o_i\rangle, \quad (2.3)$$

where $|Alice_{ready}\rangle$ denotes the initial state of Alice at t_0 . Since Bob does not perform any measurement on Alice or S during the closed interval $[t_0, t_1]$ he describes the $Alice+S$ system as undergoing unitary evolution into the entangled state

$$|\Psi(t_1)\rangle_{Alice+S} = \sum_{i=1}^n c_i |Alice_i\rangle \otimes |o_i\rangle, \quad (2.4)$$

where each $|Alice_i\rangle$ denotes the pointer state of Alice recording that S is in $|o_i\rangle$.⁸⁾ Assuming that these pointer states are mutually orthogonal—i.e., $\langle Alice_i | Alice_j \rangle = \delta_{ij}$ —Bob may trace out Alice's degree of freedom to represent the state of S at t_1 by the reduced density matrix

$$\rho_S(t_1) = \sum_{i=1}^n |c_i|^2 |o_i\rangle \langle o_i|, \quad (2.5)$$

which represents a mixed state of S —as opposed to a pure state of the system such as (2.1) or (2.2)—encoding a probability distribution over the eigenstates of O .

⁸⁾ In a realistic setting, this pointer state would be a product of numerous component states involving Alice's memories or records, her measuring devices, and so forth.

Now, it is not difficult to notice the apparent tension in the above story. According to Alice, the state of S at t_1 is given by (2.2). According to Bob, however, the state of the same system at the same moment is described by (2.5). Then, which of the two observers is correct?

One intuitive response is that Alice is in fact correct (or more accurate) because, after all, she is the one who actually measured S at t_1 , whereas Bob, who has no way of accessing her measurement result at t_1 , is simply expressing his ignorance by (2.5). This response, which is based on an *epistemic interpretation* of the reduced density matrix in (2.5), might initially look plausible in light of the fact that a density matrix of the form $\sum_{i=1}^n C_i |X_i\rangle\langle X_i|$ can be used to represent a *classical* probability distribution of states $|X_i\rangle$ with probability C_i .

However, this epistemic reading is not warranted by the formalism of quantum mechanics. Consider a simplified version of the above experiment, where O has just two eigenstates, $|o_1\rangle$ and $|o_2\rangle$, and $|c_1|^2 = |c_2|^2 = \frac{1}{2}$. Then Bob's reduced density matrix for S would be simplified to

$$\rho_S(t_1) = \frac{1}{2}(|o_1\rangle\langle o_1| + |o_2\rangle\langle o_2|). \quad (2.6)$$

Consequently, according to the epistemic reading, S is in fact in $|o_1\rangle$ at t_1 , but Bob simply does not know it, so he represents his ignorance by (2.6). To see why this reading is problematic, let us define $|o_+\rangle = \frac{1}{\sqrt{2}}(|o_1\rangle + |o_2\rangle)$ and $|o_-\rangle = \frac{1}{\sqrt{2}}(|o_1\rangle - |o_2\rangle)$. Then we can represent the same density matrix in the basis of $|o_+\rangle$

and $|o_-\rangle$ as follows:

$$\rho_S(t_1) = \frac{1}{2}(|o_+\rangle\langle o_+| + |o_-\rangle\langle o_-|). \quad (2.7)$$

If the reduced density matrices are taken to merely represent classical probability distributions as the epistemic interpretation suggests, then (2.7) would imply that S is in fact determinately in either $|o_+\rangle$ or $|o_-\rangle$, but Bob just does not know which. However, this is inconsistent with the earlier claim that S is in fact in $|o_1\rangle$, because both $|o_+\rangle$ and $|o_-\rangle$ were defined to be non-trivial superpositions of $|o_1\rangle$ and $|o_2\rangle$, and thus S cannot be determinately in $|o_1\rangle$ (or $|o_2\rangle$) while also being determinately in either $|o_+\rangle$ or $|o_-\rangle$. So, unless there is some additional element providing a preferred way of decomposing these density matrices, we cannot consistently hold that Alice is correct and Bob is simply ignorant about it. If so, how should we resolve the conflict between Alice's and Bob's descriptions of S at t_1 ?

RQM's suggestion is to assume that the quantum state of a system is meaningful only relative to other systems (observers).⁹⁾ So, in RQM, (2.2) is a correct description of S at t_1 *relative to Alice*, while (2.5) is correct for the same system at the same moment *relative to Bob*. To be more precise, instead of writing (2.2) and (2.5), one may relativize these states as

$$|\psi(t_1)\rangle_S^{(Alice)} = |o_1\rangle \quad (2.2^*)$$

9) As implicitly indicated in the postulates, the term 'observer' in RQM is not reserved for conscious or sentient beings, but may refer to any physical system.

and

$$\rho_S(t_1)^{(Bob)} = \sum_{i=1}^n |c_i|^2 |o_i\rangle \langle o_i|, \quad (2.5^*)$$

respectively, where each superscript indicates the physical system (observer) relative to which the state at issue obtains. Since (2.2*) and (2.5*) are relativized, there is no inconsistency in claiming that these two descriptions are both true (or acceptable) of the same system at the same time.

However, another question may immediately arise. Obviously, human observers can actually meet and talk to each other to compare their descriptions. So one can ask what exactly would happen if Alice and Bob actually interact for cross-checking. To clearly address this question, I will follow Adlam and Rovelli¹⁰) in formulating it in the context of *Modified Wigner's Friend*:

Alice and S are in their initial states as in the original Wigner's Friend. Also, as before, Alice measures O on S at t_1 , obtaining a measurement outcome. Let us denote this outcome O_S^{Alice} , which must be one of the eigenvalues of O , and is only meaningful relative to Alice as per (R1). Immediately after t_1 , S is sent outside of the laboratory, without undergoing any further interactions until t_2 , when Bob measures O on S himself. Relative to Bob, his O -measurement at t_2 yields one of the eigenvalues of O , which I will call O_S^{Bob} .¹¹) Subsequently, at t_3 , Bob enters Alice's laboratory to cross-check Alice's record of her outcome obtained at t_1 by asking her about it,

10) Adlam and Rovelli (2023), p. 5.

11) Here I assume that S is *not* subject to any non-zero Hamiltonian that evolves its state during (t_1, t_2) .

which can be thought of as Bob’s measurement on Alice’s pointer state. Let O_{Alice}^{Bob} be the result of this ‘measurement,’ or what Bob sees (or hears) as Alice’s outcome.

Then, the *Agreement Question* asks whether $O_S^{Alice} = O_{Alice}^{Bob}$. That is, it asks whether Alice’s measurement outcome (from Alice’s perspective) matches what Bob verifies as Alice’s outcome (from Bob’s perspective). I believe that this question is crucial in refining RQM, because depending on how one responds to it, one arrives at quite different versions of the interpretation.

For clarification, the Agreement Question should be distinguished from another question asking whether $O_S^{Bob} = O_{Alice}^{Bob}$. The answer to this latter question is clear: by (R6)—the internal consistency postulate—Bob is guaranteed to find that $O_S^{Bob} = O_{Alice}^{Bob}$. From Bob’s own perspective, the outcome he obtains at t_2 *must* match the value he learns by checking Alice’s record, at least in principle, assuming that S is not disturbed during the open interval (t_1, t_2) , since both outcomes are relativized to Bob alone.

In contrast, the Agreement Question concerns *cross-perspectival* descriptions. Due to this cross-perspectival nature of the Agreement Question, one might argue that the question is not legitimate in RQM. The postulate (R4) explicitly forbids a cross-perspectival comparison unless the comparison itself is relativized to a third observer. In Modified Wigner’s Friend, we did not have such a third observer, so one might argue that the Agreement Question is meaningless in RQM. I will return to this worry in Section 5, when I discuss the fictionalist approach, but for now, let us bypass this issue by clarifying how (R4) should be read in relation to this worry.

If we take (R4) as holding that a cross-perspectival comparison without a third observer is meaningless in *any* context, then it would

become immediately difficult to see how RQM could be motivated by narratives like Wigner’s Friend in the first place. The core tenet of RQM that quantum states are inherently observer-relative is motivated by observing that Alice’s and Bob’s descriptions of the same system at the same moment are mutually incompatible unless appropriately relativized. But this observation is possible only if we compare Alice’s and Bob’s descriptions together. So, if (R4) is read as forbidding cross-perspectival comparisons in any contexts, then it would be difficult to see how RQM could be coherently motivated.

van Fraassen notes a similar point, writing:

Rovelli, who can give these examples, is telling us only something about the *general form* that these observers’ descriptions (their information) can take, given that certain measurement interactions have taken place. [...] Rovelli does not give any specific such description of the world—he describes *the form that any description which assigns states must take*. Rovelli describes not the world, but the general form of information that one system can have about another—namely as the assignment of states relative to a given system on the basis of information available to that system.¹²⁾

On van Fraassen’s construal, Wigner’s Friend, or any similar meta-narrative for RQM, is not intended to describe the physical world, but to clarify the “general form” of physical descriptions. So, one could argue that cross-perspectival comparisons are not strictly meaningless in these meta-narratives, for they do not carry actual physical content. Without such a qualification, RQM with (R4) would be self-undermining insofar as motivated by narratives like Wigner’s Friend. With (R4) so construed, let us assume, for the sake of argument, that the Agreement Question is at least a meaningful

12) van Fraassen (2010), pp. 397–8.

question. In the next two sections, I will examine two major responses to the Agreement Question.

3. Relative RQM

RRQM responds to the Agreement Question by allowing that $O_S^{Alice} \neq O_{Alice}^{Bob}$. That is, on RRQM, the following scenario is nomologically possible: Relative to Alice, Alice obtains outcome o_1 from her measurement at t_1 . However, relative to Bob, who enters the laboratory to cross-check her result at t_3 , he hears Alice reporting a different outcome, say, o_2 . For this scenario to remain consistent with (R6), the internal consistency postulate, Bob must have obtained o_2 from his own measurement at t_2 (assuming S remained undisturbed during the interval (t_1, t_2)). Conversely, from Alice's perspective, she must perceive Bob reporting o_1 . So, according to RRQM, measurement outcomes remain irremediably relative to the observer even after ideal cross-checking, although each observer has an internally consistent sequence of experiences. The resulting picture of the world is a genuinely relativist one, which features what Jacques Pienaar describes as “an ontology of ‘island universes’.”¹³⁾

RRQM might seem naturally motivated by Bob's description of S at t_1 . As seen in the previous section, Bob's description of S at t_1 is given by the reduced density matrix in (2.5*), which assigns a non-zero probability to each outcome o_i (assuming $c_i \neq 0$). Accordingly, when Bob measures O on S at t_2 , he should be able to obtain *any* outcome o_i . At least, the relevant formalism of quantum

13) Jacques Pienaar (2021), p. 21.

mechanics imposes no constraint requiring Bob to obtain o_1 . So, even under the assumption that $O_S^{Alice} = o_1$, there is nothing in the quantum formalism that guarantees that $O_S^{Bob} = o_1$. Accordingly, given the internal consistency of Bob's perspective, there is no guarantee that $O_S^{Alice} = O_{Alice}^{Bob}$.

The observer-relativity in RRQM has at least two distinct aspects, which I will call 'vertical' and 'horizontal' relativity, respectively:

(1) 'Vertical' Relativity. It seems that the observer-relativity in RRQM 'propagates vertically' across different levels of description. To put in Timotheus Riedel's (2024) terms, RRQM seems to have "unrestricted iteration of relativity." On RRQM, the relativized statement 'Relative to Alice, S is in $|o_1\rangle$ at $t1$ ' is not true *simpliciter*, but only relative to some further physical system. So, on this view, there is simply no level of description at which one can arrive at observer-independent descriptions of the physical reality.

Riedel (2024) argues that this unrestricted iteration of relativity is naturally suggested by Rovelli's (1996) original version of RQM (which I identify with RRQM in this paper). Riedel's claim can be construed as relying on the following two premises:

(D1) According to RRQM, every state-dependent property of a physical system is instantiated only relative to other systems.

(D2) According to RRQM, a relativized physical description such as ' S_1 is in a state $|v\rangle$ relative to S_2 ' is true in virtue of some state-dependent property of the composite system $S_1 + S_2$.

(D1) expresses a central claim of RQM captured by (R1). (D2) states that what makes a relativized statement about two systems true is the state-dependent properties—e.g., spin, position, momentum, etc.—

of the composite of those two systems. As Riedel cites,¹⁴⁾ the following passage from Rovelli (1996) can be provided in support of (D2):

If the statement ‘ q has a value relative to O ’ ... has any comprehensible physical meaning at all, this meaning should be related to the contingent state of the $S-O$ system. According to the main hypothesis here, asking about the observer-independent contingent state of the $S-O$ system has no meaning [...] we can make statements about the state of the $S-O$ system, provided that we interpret these statements as relative to a third physical system P .¹⁵⁾

It is not difficult to see that (D1) and (D2) jointly generate an infinite iteration of relativity. By (D2), the first-order relative statement ‘ S is in a state $|v\rangle$ relative to S_1 ’ is true in virtue of some state-dependent property of the composite system $S+S_1$. But by (D1), this state-dependent property of $S+S_1$ is instantiated only relative to some further system, say, S_2 . Consequently, we have a second-order relative statement ‘ S is in a state $|v\rangle$ relative to S_1 relative to S_2 ,’ which, by another application of (D2), is true in virtue of some state-dependent property of $S+S_1+S_2$ —and so on and so forth. Since there is no reason to suppose that there is a privileged level of description that could serve as a natural stopping point, this chain of relativization would continue *ad infinitum*.

For this reason, Riedel (2024) argues that the nature of relativity in Rovelli’s RQM is quite different from that of special relativity, although Rovelli (1996) uses special relativity to familiarize the relative character of RQM. In special relativity, quantities such as spatial

14) Riedel (2024), p. 111.

15) Rovelli (1996), p. 1653.

distance and temporal duration are relative to the frame of reference. However, given a fixed frame, there are objective facts of the matter regarding these quantities. That is, the fact that a certain pair of events has a specific spatial distance or temporal duration relative to a given reference frame itself is an objective fact that every observer must agree on, at least in principle, since it is derived from the invariant quantities of the theory such as the spacetime interval between the relevant events. Therefore, Einsteinian relativity is not iterated beyond the second-order. In contrast, as shown above, relativity in RRQM seems to be indefinitely iterated ‘vertically’ without any stopping point.

This disanalogy with special relativity also sheds light on why relativity is indefinitely iterated in RRQM. In special relativity, while various physical quantities are relative to the reference frame, there are well-defined transformation rules—namely, Lorentz transformations—linking between different inertial frames of reference. So, for instance, while two observers traveling at a significant fraction of the speed of light may disagree regarding which set of events are simultaneous, each observer can deduce via the transformation rules precisely which set of events the other observer would regard as simultaneous (provided that their relative velocities and locations are known to them). In RRQM, on the other hand, there are no analogous determinate transformation rules connecting different perspectives. For instance, there are no exact rules that allow Bob to deduce from his own description of S at t_1 what definite outcome Alice obtained at t_1 relative to Alice. Plausibly, this lack of determinate cross-perspectival transformation rules is what gives rise to the unrestricted iteration of relativity in RRQM.¹⁶⁾

In my view, this ‘vertical’ relativity is perplexing but tolerable—indeed, it might be regarded as a feature rather than a defect. After all,

16) See Jacobs and Read (2025), p. 6 on this point.

RQM is often glossed with the denial of a “view from nowhere”,¹⁷⁾ in which case it is hard to imagine how unrestricted iteration of relativity can be avoided. However, RRQM seems to feature a more problematic kind of relativity.

(2) ‘Horizontal’ Relativity. As already mentioned, in RRQM, even when different observers make causal contact for cross-checking, there is no guarantee that their outcomes will *actually* match (although the mismatch will remain undetectable by either party). Moreover, such a discrepancy may cascade via unitary evolution, resulting in further observer-relative facts. In Modified Wigner’s Friend, for instance, once $O_S^{Alice} \neq O_S^{Bob}$ obtains, then, the state of S relative to Bob would be correlated with Alice’s corresponding pointer state, yielding $O_{Alice}^{Bob} = O_S^{Bob}$. Consequently, $O_S^{Alice} \neq O_{Alice}^{Bob}$ should obtain for internal consistency. So, there is a sense in which the initial observer-relativity concerning the state of S ‘propagates horizontally’ via unitary correlation to Alice’s and Bob’s pointer states (corresponding to their memories or records), and potentially extending beyond them, via further interactions.

In this vein, Adlam and Rovelli write:

So it seems that there is no way for anybody but Alice to ever find out what Alice’s measurement result was. Even when Alice tries to communicate to other observers what result she saw, internally consistent descriptions [(R6)] guarantees that everyone will always perceive her to be agreeing with them, and thus no form of communication will ever bridge the gap between Alice’s perspective and the other observers around her.¹⁸⁾

17) Ruyant (2018), p. 447.

18) Adlam and Rovelli (2023), p. 5.

Even though RQM is predicated on observer-relativity from the outset, the consequence of RRQM that this relativity is not resolved, but rather potentially amplified, by cross-checking might seem difficult to tolerate, given that science is a collaborative endeavor. The ‘horizontal’ relativity seems problematic since it can threaten the very epistemic conditions under which we could rationally take quantum mechanics as empirically confirmed.¹⁹⁾ According to Adlam (2022), the lack of genuine intersubjective agreement yields the risk of undermining the objectivity of science, because empirical verifications themselves would be subject to the same sort of observer-relativity discussed so far. So, one could argue that, if RRQM is true, then the usual methods by which science attempts to pursue objectivity—e.g., testimony, replication, cross-checks, etc.—all fall short of guaranteeing a reliable evidential common ground. Then there is a sense in which RRQM is epistemically self-undermining, for it effectively denies the objectivity of the very type of activities scientists rely on to gather evidence for quantum mechanics (and hence for RRQM itself). If so, one may ask, why should we trust RRQM in the first place?

One might argue that “stable facts” arising via decoherence mitigate the worry to a certain extent (Di Biagio and Rovelli 2021, 2022). Here, “stable facts” refer to (usually) macroscopic facts stabilized by decoherence, where observer-relativity can be practically neglected by a large class of systems. In the macroscopic regime, most facts would be stable in this sense, which is why they may seem to mitigate the intersubjectivity worry.

However, it still seems hard to deny that RRQM stands on epistemically shaky grounds, especially given that many experimental

19) See Adlam (2022) for this line of criticism, although her target is a broad class of interpretations of quantum mechanics, including QBism and neo-Copenhagen views, in addition to RQM. See also Adlam and Rovelli (2023) for relevant discussions.

results in support of quantum mechanics involve, not surprisingly, microscopic quantum systems, which exist in the regime where decoherence may not always be relevant.²⁰⁾

In light of the intersubjectivity worry, Adlam and Rovelli (2023) propose a new version of RQM—ARQM—that seems less radical than RRQM. I will discuss ARQM in the next section.

4. Absolute RQM

ARQM yields an answer to the Agreement Question different from RRQM's. Adlam and Rovelli motivate ARQM by appeal to the notion of the physicality of information: "Alice's knowledge is physical: thus, there *must* be some measurement that Bob can perform on her that will reveal information about her measurement outcomes to him," where "part of what it means for that information to be "physical" is that it should be accessible to other observers who have access to Alice and the ability to perform appropriate measurements."²¹⁾ Without this accessibility of physical information across perspectives, they argue, intersubjective agreement between observers becomes impossible, which—as already discussed in the previous section—would undermine

20) Moreover, Adlam argues that appeals to decoherence do not secure intersubjective, agreement, for decoherence only guarantees a stable macroscopic reality for *each observer*, and there is no guarantee that these stable realities coincide (Adlam 2022, pp. 13-4). I do not fully agree with this claim, however, for insofar as different observers share the same environment, their states will be unitarily correlated yielding internal consistency for all parties. However, a thorough discussion on how decoherence affects observer-relativity in RQM goes beyond the scope of this paper. In any case, I agree with Adlam's claim that decoherence alone fails to provide sufficient grounds for intersubjectivity.

21) Adlam and Rovelli (2023), p. 7.

the very process of empirical confirmation that undergirds science as a collaborative endeavor.²²⁾

To secure minimal intersubjectivity for science, Adlam and Rovelli propose to replace (R4) in Section 2—which states that it is meaningless to compare descriptions relative to different systems without invoking a third system—with the following postulate:

Cross-perspective links (CPL): In a scenario where some observer Alice measures a variable V of a system S , then provided that Alice does not undergo any interactions that destroy the information about V stored in Alice’s physical variables, if Bob subsequently measures the physical variable representing Alice’s information about the variable V , then Bob’s measurement result will match Alice’s measurement result.²³⁾

To see how CPL can be put to work, recall Modified Wigner’s Friend, where we assumed (i) Alice measures O on S at t_1 , obtaining outcome O_S^{Alice} , (ii) Bob measures O on S at t_2 , obtaining outcome O_S^{Bob} , and (iii) Bob ‘measures’ Alice’s pointer state at t_3 to check the result of her O -measurement, obtaining outcome O_{Alice}^{Bob} . Again, we assume that there is no other relevant disturbance for S . Then what CPL states is that O_S^{Alice} and O_{Alice}^{Bob} must be in agreement with each other. That is, if Alice obtained o_1 at t_1 , relative to herself, then when Bob enters the laboratory at t_3 and asks Alice about her outcome, Bob *must* hear Alice reporting o_1 . Additionally, given (R6), the internal consistency postulate, $O_S^{Bob} = O_{Alice}^{Bob}$. So, ARQM offers a non-relativist answer to the Agreement Question, according to which

22) *Ibid.*, p. 6.

23) *Ibid.*, p. 7.

Alice's and Bob's measurement results must match, provided that they actually interact with each other for cross-checking.

Note that the proviso of cross-checking interaction is not trivial here. ARQM does not entail that measurements by distinct observers will always be in agreement even if the observers never make cross-checking interactions after their independent measurements. This can be viewed as part of what distinguishes ARQM from a full absolutist stance that allows observer-independent facts unconditionally. The conditional nature of agreements in ARQM is plausibly due to the fact that CPL primarily seeks to secure minimal intersubjectivity for scientific collaboration, rather than an absolutist metaphysical foundation.

As a result, ARQM appears to place itself in a delicate middle ground. On the one hand, it seeks to preserve the core insight of RQM that quantum states are inherently relative: Even on ARQM, Alice's and Bob's descriptions of S at t_1 may differ from one another in the same way they differ in RRQM. Moreover, if Alice and Bob never undergo any necessary interactions for cross-checking after their independent measurements, then ARQM does not guarantee that their outcomes match. On the other hand, ARQM demands that whenever cross-checking interactions take place, their outcomes must genuinely match, at least in principle, securing intersubjectivity for science. So, while ARQM would still allow some form of 'horizontal' relativity, it will block (by design) the problematic ones that could epistemically undermine collaborative scientific practices.

It seems far from clear, however, whether ARQM's conditional absolutism is a stable position. Jacobs and Read argue that if the systematic cross-perspective coordination that CPL stipulates really obtains, then the best explanation for such an alignment would involve genuinely absolute quantum states. Jacobs and Read's argument draws

on the notion of a “cosmic conspiracy,” which is characterized as “an axiom or theorem the truth of which is unlikely/unexplained unless the theory is mistaken about its fundamental ontology”.²⁴⁾ As a paradigmatic case of a cosmic conspiracy, they borrow Tim Maudlin’s (2007) example of the triangle inequality. The triangle inequality states that the distance between two points is never greater than the sum of the distances via an intermediate point. The thought is that this principle would be an inexplicable cosmic conspiracy if distances are taken as fundamental qualities, for “[t]here is no reason to expect that distances satisfy the inequality unless they are not fundamental but depend on path lengths.”²⁵⁾

Similarly, Jacobs and Read (2025) argue that CPL would strike us as a cosmic conspiracy if it is taken as a primitive principle, not explained by more fundamental facts within ARQM. However, arguably, the best candidate for such an explanation would require some observer-independent states of the systems. But the existence of such non-relative, absolute states is precisely what RQM denies. (Furthermore, it might require an epistemic reading of Bob’s reduced density matrix for S at t_1 , which makes it incompatible with the formalism of quantum mechanics for the reasons discussed in Section 2.) Therefore, one could argue that ARQM runs the risk of collapsing into full (unconditional) absolutism about quantum states, in which case ARQM would simply be a different interpretation of quantum mechanics rather than a version of RQM, or else, it posits an undesirable cosmic conspiracy.

24) Jacobs and Read (2025), p. 11.

25) *Ibid.*, p. 11.

5. Fictional RQM

In this section, I present yet another possible response to the Agreement Question, FRQM. The core idea behind FRQM is roughly as follows: In fiction, we often encounter questions for which no definite answers exist, not because of epistemic or linguistic limitations, but because there is simply no fact of the matter that could settle them. For instance, consider the question of whether Hamlet has an even number of hairs. Arguably, this question does not have a definite answer, since both an affirmative and a negative answer are consistent with the relevant fictional work, namely *Hamlet*. Analogously, the thought is, if RQM involves some kind of fiction, then certain questions—hopefully questions including the Agreement Question—may not have any definite answer.

One might say that postulate (R4), stating the relativity of comparisons, already suggests that the Agreement Question is meaningless in RQM. As briefly discussed in the end of Section 2, however, such an unqualified reading of (R4) is not straightforwardly acceptable. For if cross-perspectival comparisons are entirely meaningless even in the meta-narratives like Wigner's Friend, then RQM cannot be coherently motivated in the first place. However, by treating the meta-narratives as fiction, I argue, there is room for maintaining that *while the cross-perspectival comparisons required to motivate RQM are allowed within the fiction, questions such as the Agreement Question are not legitimate even within the fiction.*

To make sense of the fictionalist response to the Agreement Question, one needs to answer at least the following three questions. First, what kind of fiction is involved in RQM? Second, which questions are legitimate and which are not in the fiction at issue? Third, what could possibly warrant accepting RQM if it rests on mere

fiction? In the remainder of this section, I will attempt to outline FRQM by answering these questions.

5.1. RQM and Perspectival Fiction

The term ‘fiction’ is not entirely unfamiliar in the RQM literature. Introducing RQM, van Fraassen writes:

Following Rovelli’s own convenient fiction of observers who measure and assign states to the objects they measure, we can think of those observers as having assimilated Rovelli’s view, and thus having available some of his observer-independent description of what is going on.²⁶⁾

On my reading, the sense in which van Fraassen calls Wigner’s Friend a “convenient fiction” is not very different from the usual sense of the word found in the literature on fictionalism, where the term typically refers to a set of statements that is accepted as useful in some way, yet is acknowledged to be strictly false (usually) because the entities it posits do not actually exist.

However, the standard meta-narratives used to introduce RQM—which I will henceforth call *RQM-narratives*—do not need to be taken as fictional in this usual sense. Of course, the observers in Wigner’s Friend (i.e., Alice and Bob) and the measured system S are introduced as part of a thought-experiment, and in *that* respect, they are fictional in the usual sense. However, it is not difficult to imagine—and in principle physically not impossible to realize—a situation in which two actual observers are asymmetrically situated with respect to a particle in the way that Wigner’s Friend describes. So, if RQM-narratives are fictional in some substantive sense, the relevant ‘fictionhood’ is not

26) van Fraassen (2010), p. 391.

essentially tied to the ontology of the entities involved.

On the view that I explore for consideration, RQM is fictional in the following sense: An RQM-narrative is offered from a standpoint that is nomologically impossible on RQM's own account. RQM rejects observer-independent descriptions of quantum states and measurement outcomes. However, when we (or Rovelli) tell a story like Wigner's Friend to motivate RQM, we concatenate such descriptions from multiple perspectives *as if* we could occupy a privileged vantage point from which all observer-relative facts can be jointly considered, despite that such a perspective is technically forbidden by (R4). This *pretence* can be taken as an element of fiction, which serves as a heuristic device that helps us understand the core insights of RQM.

For illustrative analogies, consider the Cubist paintings of Pablo Picasso, such as *Portrait of Dora Maar*, or M. C. Escher's lithograph *Relativity*. These images place the viewer at an impossible vantage point that aggregates mutually exclusive perspectives. Similarly, the Mercator projection generates a global map that represents the three-dimensional globe on a two-dimensional plane from what appears to be a fictional viewpoint. Of course, these paintings and maps are not sets of statements, and therefore may not qualify as fictions in the strict sense. Still, if we allow the accuracy of representations to correspond to the truth values of statements (or, more precisely, the probabilities of statements), we can take these visual representations as analogies for perspectival fiction.

Perhaps a more direct example of perspectival fiction would be a narrative written from an omniscient author's point of view. In such a narrative, the narrator often takes a fictional perspective capable of accessing the private thoughts and feelings of multiple individuals. Imagine a novel, written from an omniscient author's point of view, that illustrates in detail how two individuals feel about a certain

incident. Assume that this story faithfully reflects some actual events involving them. Even if the external dialogues and actions were factually accurate, the narrative would still contain fictional elements in that it provides a detailed description of the private thoughts and feelings of more than one person, which are presumably accessible only by the individuals having them. The adoption of this omniscient viewpoint arguably constitutes the perspectival fictionhood of this portion of the novel.²⁷⁾

One notable feature of perspectival fiction is that we might lack grounds to dismiss its individual statements as false. For each part (sentence) of that fiction might well be written by some individual who can access the events, thoughts, and feelings described in that particular part. What we cannot coherently assume, however, is that the entire text covering multiple individuals' inner states is all true. So, the fictional story can be, in principle, locally veridical but it can never be globally veridical.

FRQM holds that RQM-narratives are fictional in a similar manner. Taken in isolation, each description in an RQM-narrative could actually be true from the perspective of some observer. If Alice were the actual narrator of Wigner's Friend, for instance, the Alice-relative descriptions would be veridical (relative to Alice). The same would hold for the Bob-relative descriptions if Bob were the narrator of the story. In any case, however, the whole narrative juxtaposing two observer-relative descriptions is not, by RQM's own light, something that any physical observer can tell us. So, one could argue that an RQM-narrative is meaningful only as useful fiction.

27) In fact, this sort of perspectival element has been argued to be central to fictionhood itself. For instance, Dorrit Cohn (1978) identifies the ability to access the inner lives of distinct characters as the "sign of fictionality," or the defining feature of fiction that clearly distinguishes it from history or biography.

Now, I think that it is worth distinguishing FRQM from a similar, yet distinct construal of RQM, which is arguably hinted at in the following passage from van Fraassen (2010). Analyzing Rovelli's (1996) presentation of Wigner's Friend, van Fraassen writes:

Rovelli describes not the world, but the general form of information that one system can have about another—namely as the assignment of states relative to a given system on the basis of information available to that system [...] So we have here a *transcendental* point of view.²⁸⁾

As discussed earlier, I largely agree with van Fraassen's analysis that Rovelli's presentation provides the "general form" of information rather than specific descriptions of physical reality, which is consistent with treating the RQM-narrative at issue as some sort of fiction. However, I maintain that van Fraassen's use of the term "transcendental" can be misleading in a non-trivial way. Characterizing the RQM-perspective as transcendental runs the risk of attributing some form of reality to it, even if it is admittedly not a physically realizable perspective. If we grant the RQM-perspective a transcendental status, it would be difficult to see why or how the Agreement Question is illegitimate. That is, if the viewpoint of an RQM-narrative is transcendental rather than fictional, then it would be difficult to explain why the question regarding the global consistency of measurement results is illegitimate even from the transcendental narrator's perspective.

To clarify what I take to be the difference between a 'fictional' perspective and a 'transcendental' perspective, recall our previous discussion on special relativity. This time, consider a four-dimensional Minkowski spacetime represented from the perspective of an observer outside of spacetime itself. Obviously, such a perspective is physically

28) van Fraassen (2010), p. 398.

unattainable just as the perspective of an RQM-narrative is. However, as noted earlier, the physical descriptions provided by distinct observers in different inertial frames of reference are deterministically connected via Lorentz transformations, which makes these perspectives mutually commensurable. Since the meta-perspective of spacetime is fully grounded in some objective transformation rules, it seems appropriate to call it ‘transcendental,’ and to take the descriptions from that perspective generally legitimate. However, in RQM, there are no analogous universal deterministic transformation rules mapping arbitrary observer-relative descriptions into one another (unless through a third observer). In my view, this lack of cross-perspectival rules is part of why the perspective of an RQM-narrative should be taken as fictional rather than transcendental.

5.2. Illegitimate Questions in RQM-narratives

Treating RQM-narratives as fiction gives us the license to claim that it is possible, and perhaps expected, that there exists some illegitimate question in RQM. However, it does not automatically tell us *which* questions are illegitimate. In particular, it does not give us the license to dismiss the Agreement Question as meaningless while endorsing cross-perspectival comparisons needed to motivate RQM.

Plausibly, whether a certain question or description regarding a work of fiction is legitimate depends on the specific content of the fiction in question. For instance, although the question of whether the protagonist has an even number of hairs may lack a determinate answer in *Hamlet*, it might be determinately answered in a different fictional story where such details are explicitly provided. So, to develop a fictionalist account of RQM, one needs to offer some standard for distinguishing legitimate questions from illegitimate ones within an RQM-narrative.

One possible suggestion is that a question in RQM is meaningless if

it requires descriptions relative to different observers *and* those descriptions concern different times. In other words, the thought is, in an RQM-narrative, one is allowed to juxtapose a description relative to A indexed by a moment t_a and another description relative to B indexed by t_b only if $a = b$ or $A = B$. If a question demands such a juxtaposition of descriptions where $a \neq b$ and $A \neq B$, then we would be required to consider a dynamical process occurring over a non-zero interval of time relativized to multiple observers. The suggestion is that such a comparison is not permitted even in the RQM fiction.

The thought behind this suggestion is that dynamical laws of quantum mechanics—which RQM-narratives must appreciate—allow us to connect descriptions from two different points in time only from a single perspective. So, on this suggestion, what is allowed in an RQM-narrative is a juxtaposition of *kinematic* descriptions—a set of ‘snapshot’ descriptions of the relevant systems at a particular moment—from one or more perspectives, or *dynamical* descriptions—descriptions of the systems at issue covering a non-zero interval—from a single perspective. Consequently, the suggestion goes, a juxtaposition of dynamical descriptions taken from multiple positions—i.e., descriptions with $a \neq b$ and $A \neq B$ —is not permitted in an RQM-narrative.

However, this suggestion seems to exclude too much. Recall that in Wigner’s Friend, we described how the system S evolves from t_1 to t_2 from Alice’s perspective and also how it evolves during the same interval from Bob’s perspective. That is, relative to Alice, we assumed that the system non-unitarily evolves from (2.1) to (2.2), and, relative to Bob, the $Alice + S$ system evolves unitarily from (2.3) to (2.4), from which Bob could derive the evolution of S . A juxtaposition of these cross-perspective dynamical descriptions was utilized by Rovelli in motivating RQM, in virtue of which he observes that “[i]n quantum mechanics different observers may give different accounts of the same

sequence of events.”²⁹⁾ So, the criterion suggested above would illegitimize even the descriptions that motivate RQM.

I suggest that a better proposal looks something like the following: a question is legitimate in RQM only if answering it does not require juxtaposing cross-perspectival descriptions that jointly involve *two or more non-unitary dynamical processes*. The Agreement Question requires us to consider Alice’s description of S up to t_1 , which involves a non-unitary process—i.e., one that corresponds to the ‘collapse’ of the state of S upon Alice’s measurement—alongside Bob’s description of Alice (or her pointer state) up to t_3 , which involves another non-unitary evolution corresponding to the ‘collapse’ of Alice’s pointer state upon Bob’s interaction with Alice. So, the Agreement Question demands us to juxtapose cross-perspectival dynamical descriptions featuring more than one non-unitary process. My proposal is that such a question is meaningless even within an RQM-narrative.

Here is the rationale: when one is concerned only with the unitary processes of the systems at issue, it may be possible, at least in principle, to describe those processes in an observer-independent manner. In my view, this is why the Everettian interpretation (the many-worlds interpretation), which endorses only unitary evolution governed by the Schrödinger equation—while dispensing with non-unitary collapse—admits of an absolute description of the world. However, once we endorse non-unitary processes in addition to unitary evolution—as we do in RQM following standard quantum mechanics—descriptions involving any non-unitary process become inherently tied to the relevant observer. Then, the suggestion is that what RQM should really prohibit is not cross-perspectival comparison *per se*, but rather the comparison of results from two or more distinct non-unitary

²⁹⁾ Rovelli (1996), p. 1643.

processes. For such comparisons fly in the face of the fact that non-unitary processes are inherently wedded to the observer.

To be precise, it should be noted that whether a given dynamical process is unitary or non-unitary *itself* is observer-dependent. Indeed, Alice's 'measurement' counts as a non-unitary evolution only from Alice's own perspective; relative to Bob, Alice—or, more precisely, *Alice + S*—undergoes unitary evolution even after Alice's interaction with *S*. If we do not make this clear, we would be violating (R2), which states that unitary quantum mechanics is complete. Unitary quantum mechanics is complete, according to RQM, in that fundamental dynamics remains unitary, and apparent collapse is an observer-relative phenomenon rather than a fundamental dynamical process. That said, relative to some observer, we can talk of non-unitary collapse as a dynamical process producing new states over time.

So, to be clear, let us say that a dynamical process in a description relative to an observer *A* is a *relativized non-unitary process* if the process is non-unitary from the perspective of *A*. Then the proponent of FRQM could suggest replacing (R4) with the following:

(R4*) It is meaningless, *within an RQM-narrative*, to compare the accounts relative to any two systems except by invoking a third system relative to which the comparison is made, *if those accounts jointly feature two or more relativized non-unitary processes*.

With this modification, FRQM holds that the Agreement Question is not a meaningful question that can possibly be answered within an RQM-narrative.³⁰⁾ It allows, however, cross-perspectival comparisons

30) To clarify, on FRQM, the Agreement Question is not only illegitimate within the RQM-fiction but also outside of it, since the question cannot even be formulated without the fictional narrative. (By analogy, the question of whether Hamlet has an

within such a meta-narrative if they involve at most one relativized non-unitary process.

Now, what becomes of intersubjectivity in FRQM? According to FRQM, the Agreement Question itself is meaningless even within the RQM fiction, and so are both positive and negative answers to it. That is, according to FRQM, neither $O_S^{Alice} = O_{Alice}^{Bob}$ nor $O_S^{Alice} \neq O_{Alice}^{Bob}$ is truth-apt. Therefore, we can neither say that FRQM secures intersubjectivity nor that it lacks it. Consequently, FRQM cannot provide any positive grounds for thinking that collaborative confirmation in science is reliable. At the same time, however, FRQM seems immune to the intersubjectivity objection to RRQM that it is self-undermining, since it simply denies that the objection can be meaningfully formulated in the first place. I believe that whether this is a satisfactory stance remains an open question that warrants further investigation.

5.3 Is FRQM Worth Considering?

One natural objection to FRQM would be that treating RQM-narratives as mere fiction simply amounts to admitting that the claims of RQM are false. If, the objection goes, what motivates RQM is not only false, but nomologically impossible to be true, then why should FRQM be taken seriously at all?

The proponent of FRQM can respond that the rationale drawn from the fictional narratives, such as the claim that the state of a system is relative to another system, can nevertheless be literally true, or at least acceptable. As van Fraassen notes in the passage quoted earlier,³¹⁾

even number of hairs is not merely illegitimate within the novel *Hamlet*, but meaningless *simpliciter*.)

31) van Fraassen (2010), p. 397.

RQM-narratives can tell us the “general form” of physical descriptions in quantum mechanics, and this formal knowledge can still be valid outside the RQM fiction, or at least acceptable for its usefulness in improving our understanding of the way quantum mechanics describes the physical reality. That is, the proponent of FRQM can hold that the core postulates of RQM, (R1)–(R6), with (R4) replaced by (R4*), are all true or acceptable as legitimate constraints on the general form of physical information.

Utilizing fiction to draw insights into physical reality is not unfamiliar in science. Scientific reasoning routinely relies on idealized assumptions that are, strictly speaking, false—e.g., point masses, frictionless planes, perfectly rigid bodies, and so forth. While fictional, these ideas have immensely helped us in understanding the true workings of the physical world. Similarly, even if RQM-narratives that motivate the observer-relativity of quantum states are not true, or, more precisely, nomologically impossible to be true, they can still help produce true or acceptable claims.

In particular, they can help make sense of one of the chief motivations behind RQM, the attempt to address or dissolve (a form of) the measurement problem by understanding measurement as physical interaction.³²⁾ According to standard quantum mechanics, there are two separate dynamical rules: When the system at issue is not being measured, it evolves unitarily according to the Schrödinger equation; when the system is measured, it undergoes non-unitary collapse with probabilities given by the Born rule.³³⁾ The presence of the notion of measurement in what purports to be the fundamental

32) See Rovelli (1996), pp. 1638–9, 1642–3, 1648, 1666 for relevant discussions. See Maudlin (1995) for different formulations of the measurement problem and different attempts to address them.

33) See Friebe *et al.* (2018), Section 2.2.2.

dynamical laws has famously invited much philosophical debate over the past hundred years. One such question asks what counts as a measurement. In response to this question, RQM holds that the notion of measurement can be replaced by any physical interaction in which one system becomes appropriately correlated with another system.

But if measurement is just appropriate interaction, a further question arises. When a human observer measures S , the observer can describe the post-measurement state of S based on their outcome. However, if two particles a and b interact in an appropriate way with one another, what does it mean for a to ‘describe’ the state of b after interaction? According to RQM, it is simply b having a state relative to a . Arguably, the acknowledgement of this system-relative nature of quantum states provides conceptual resources needed to make the idea of measurement-as-interaction intelligible. So, although RQM-narratives may be nomologically impossible, they provide useful resources for rendering quantum mechanics understandable.

6. Conclusion

In this paper, I have distinguished three ways of construing RQM—RRQM, ARQM, and FRQM—by focusing on the Agreement Question, which asks whether cross-checking interactions can, in principle, dissolve the observer-relativity posited by RQM. FRQM is a new suggestion in this paper. It treats the standard meta-narratives for RQM as a kind of fiction in that they juxtapose incommensurable perspectives in a way that is nomologically impossible on RQM’s own terms. On FRQM, such narratives can function as heuristic devices for exhibiting the “general form” of information in quantum mechanics, as van Fraassen (2010) notes, and for motivating the core insights of

RQM, while limiting what can be legitimately asked in RQM. In particular, I have suggested that a question whose answer requires jointly considering multiple non-unitary evolutions—e.g., the Agreement Question—is illegitimate even within the fictional meta-narratives.

On FRQM, at least some of the core tenets of RQM themselves are based on fictional—hence false—accounts. However, those tenets may still be warranted as advancing our understanding of quantum mechanics. Perhaps the proponent of FRQM could highlight the function of the fictional narratives for RQM in a Wittgensteinian manner expressed in the following famous passage:

My propositions are elucidatory in this way: he who understands me finally recognizes them as senseless, when he has climbed out through them, on them, over them.³⁴ (He must so to speak throw away the ladder, after he has climbed up on it.)

The proponent of FRQM could argue that the RQM-narratives can be understood in a similar spirit: they offer a ‘ladder’ that helps us see how quantum mechanics can be understood coherently without a primitive notion of measurement or an observer-observed dichotomy. Once proper understanding is achieved, the meta-narratives, along with some questions peculiar to the narratives such as the Agreement Question, can be set aside. While I do not claim that FRQM is the uniquely correct way of understanding RQM, I do believe that it deserves further exploration.

³⁴) Wittgenstein (1922), 6.54.

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관계적 양자역학의 세 가지 해석: 상대주의적, 절대주의적, 허구주의적 접근

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관계적 양자역학(RQM)은 물리적 변량들이 오직 다른 계에 상대적으로만 명확한 값을 지닐 수 있다고 보는 양자역학의 한 해석이다. 최근 문헌에서는 RQM을 이해하는 두 가지 상이한 방식이 논의되어 왔다. 상대주의적 RQM과 절대주의적 RQM이 그것이다. 이 두 입장은 일치 문제(Agreement Question)에 대해 어떻게 답하는지에 있어 차이를 보인다. 일치 문제는 RQM에서의 관찰자-상대성이 관찰자들이 교차 확인을 거친 이후에도 여전히 유지되는가를 묻는다. 상대주의적 RQM은 관찰자-상대성이 교차 확인 후에도 지속된다고 주장하는 반면, 절대주의적 RQM은 그러한 교차 확인이 반드시 일치를 가져온다고 상정한다. 이 논문에서 필자는 먼저 이 두 입장을 비판적으로 논의한다. 이어서 RQM을 이해하는 세 번째 방식—허구주의적 RQM—을 제시한다. 이 해석은 일치 문제 자체를 부적절한 것으로 간주한다. 허구주의적 RQM은 RQM이 일종의 ‘관점 허구’에 기반한다고 보며, RQM 도입의 근거를 제공하는 기본적인 교차 관점적 기술은 이 허구 내에서 허용되지만, 일치 문제에 답하기 위해 요구되는 복수의 비유니터리(non-unitary) 진화를 포함하는 교차 관점적 기술은 이 허구 내에서조차 무의미하다고 본다. 필자는 RQM에 대한 허구주의적 이해를 추가적 탐구의 가치가 있는 제3의 선택지로서 제시한다.

주요어: 관계적 양자역학, 상대주의, 허구주의, 관점 허구

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