

# Interpretations

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By the interpretation here we understand a particular way in which agents apply a theory to yield predictions about other agents’ outcomes. It is only measurement model-specific, and shows how agents model measurements.

**Copenhagen interpretation.** We have already shown an example of an application of the Copenhagen interpretation in the analysis we have conducted when describing the paradox in Frauchiger-Renner thought experiment. This result is derived under following assumptions:

1. (Q) Agents use a weaker version of Born rule, applicable only to deterministic outcomes, to formulate their predictions;
2. (S) Agents experience only one outcome;
3. (C) Agents reason from viewpoints of each other;
4. (U) Agents assume unitary evolution in each others labs.

That is, agents model the evolution of the joint system as a unitary, taking into account the superposition.

Further discussion on the assumptions can be found in [1, 2].

**Collapse theory.** Collapse theory, as it is modeled by agents, is represented as a tree of possible outcomes (each branch corresponding to a certain probability), implemented as a class *QuantumTree* to keep track of possible branches with their respective probabilities. Each branch of the *QuantumTree* is a *QuantumSystem* instance, corresponding to a possible outcome state.

## References

- [1] Frauchiger, D. & Renner, R. Quantum theory cannot consistently describe the use of itself. *Nature Communications* **9**, 3711 (2018). URL <https://doi.org/10.1038/s41467-018-05739-8>.
- [2] Nurgalieva, N. & del Rio, L. Inadequacy of modal logic in quantum settings. *EPCTS* **287**, 267–297 (2019). [arXiv:1804.01106](https://arxiv.org/abs/1804.01106).