# Article information:

Arrow of time and its reversal on the IBM quantum computer | Scientific Reports  
<https://www.nature.com/articles/s41598-019-40765-6>

# Article summary:

1. The irreversibility of time has been a subject of continuous attention in physics, with various aspects of the problem being explored.

2. In quantum mechanics, time irreversibility emerges even on the level of a single evolving particle, and becomes even more complex with entangled particles.

3. The article demonstrates that the time-reversal complexity of a developed quantum state scales linearly with the dimension of the Hilbert space swept by the system in the course its forward time evolution, but can be artificially administered through a supersystem.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

The article discusses the fundamental question of the origin of irreversibility of time in quantum mechanics. While it provides a comprehensive overview of previous research on the topic, it also presents new insights into the complexity of time reversal operations and their spontaneous emergence in nature.

One potential bias in the article is its focus on the limitations of natural systems to spontaneously reverse time, which may overlook potential technological advancements that could enable such reversals. Additionally, the article does not explore counterarguments or alternative perspectives on the topic, which could provide a more balanced view.

The article also lacks evidence for some of its claims, such as the assertion that a universal operation to reverse any arbitrary wave function does not exist in nature. While this may be true based on current knowledge, future discoveries could challenge this claim.

Furthermore, while the article notes potential risks associated with attempting to reverse time in quantum systems, it does not fully explore these risks or provide recommendations for mitigating them.

Overall, while the article provides valuable insights into the complexity of time reversal operations in quantum mechanics, it would benefit from a more balanced approach that considers alternative perspectives and acknowledges potential limitations and risks.

# Topics for further research:

* Alternative perspectives on the origin of irreversibility of time in quantum mechanics
* Technological advancements for reversing time in quantum systems
* Evidence for the non-existence of a universal operation to reverse any arbitrary wave function
* Risks associated with attempting to reverse time in quantum systems
* Mitigating risks of time reversal operations in quantum mechanics
* Implications of time reversal operations in quantum mechanics for the nature of time and causality

# Report location:

<https://www.fullpicture.app/item/136baeaaa1b2de85b3a18e32fdb0ec59>