**Faculti Summary**
https://staging.faculti.net/how-to-engineer-a-quantum-wavefunction/

This video discusses a collaborative research project involving two co-authors, focused on exploring black holes through laboratory experiments. The authors reflect on a conversation about the validity and implications of tabletop experiments that simulate black hole dynamics, particularly using fluid dynamics and water to represent phenomena around black holes. They question how insights from these experiments can apply to quantum systems, given the complexities and challenges associated with studying such phenomena directly in nature.

The discussion includes the importance of inferential strength in scientific experimentation, emphasizing the need for both internal validation (verifying models in controlled conditions) and external validation (confirming findings in varied conditions). The authors draw parallels between quantum simulations and classical experiments, noting that while both seek to model systems for understanding, they face different challenges due to the material types involved.

The paper also touches on the hopeful future of quantum computing and the potential for analog quantum simulations to push the boundaries of scientific understanding, while cautioning that these simulations provide weaker inferential links compared to direct experimental access.

Overall, they conclude that there may be a blurred line between what we know about systems through experimentation and the systems' inherent properties. The philosophical implications of this uncertainty in understanding quantum systems are discussed, highlighting the intertwining of knowledge and the nature of reality in the quantum realm, especially as technological advances develop further.