
SEMINAR: Towards an Artificial Muse for new Ideas in Quantum Physics

MARIO KRENN

January 27, 2023

12:00 to 13:00

Seminar Room & Online

Artificial intelligence (AI) is a potentially disruptive tool for physics and science in general. One crucial question is how this technology can contribute at a conceptual level to help acquire new scientific understanding or inspire new surprising ideas.

I will talk about how AI can be used as an artificial muse in quantum physics, which suggests surprising and unconventional ideas and techniques that the human scientist can interpret, understand and generalize to its fullest potential.

[1] Krenn, Kottmann, Tischler, Aspuru-Guzik, Conceptual understanding through efficient automated design of quantum optical experiments. *Physical Review X* 11(3), 031044 (2021).

[2] Krenn, Zeilinger, Predicting research trends with semantic and neural networks with an application in quantum physics. *PNAS* 117(4), 1910-1916 (2020).

[3] Krenn, Pollice, Guo, Aldeghi, Cervera-Lierta, Friederich, Gomes, Hase, Jinich, Nigam, Yao, Aspuru-Guzik, On scientific understanding with artificial intelligence. *Nature Review Physics* 4, 761 (2022).

Bio:

I am a research group leader of the [Artificial Scientist Lab](#) at the [Max Planck Institute for the Science of Light](#) (Theory Division)

I am excited about the potential of artificial intelligence-inspired and -augmented science, and how we can use algorithms in a more creative way. To make progress, I believe it will be important to learn what humans mean by crucial scientific concepts such as surprising, creativity, understanding or interest. I have created AIs for designing quantum experiments and hardware (several actually build in labs) and inspiring novel ideas for quantum technologies. (Part of this research has recently been summarized in a nice article in [Scientific American](#)). I also build autonomously semantic network from scientific publications, and use machine learning to predict and suggest personalized future research questions and ideas. In that sense, we use the machine as a source of inspiration to accelerate scientific progress. Ultimately, I want to create algorithms that help us to uncover the secrets of the Univers



. More details at <https://mariokrenn.wordpress.com/>

Hosted by: Antonio Acin and Valerio Pruneri