Contribution ID: **12**   Type: **Individual Talk**

An Introduction to Quantum Machine Learning for Neutrino Astronomy

Thursday, 24 August 2023 13:00 (35 minutes)

Next-generation experiments in particle physics necessitate immense computational resources. Quantum Machine Learning (QML) could be a potential solution to mitigate these computational challenges. This talk will illuminate recent advances in QML and discuss our efforts to introduce this budding technology to IceCube. I will detail our methodology for translating classical data into quantum states and elaborate on our strategy for classifying IceCube neutrino events using a Variational Quantum Classifier (VQC). VQCs exploits the mapping of input data to an exponentially large quantum state space to enhance the ability to find an optimal solution. Our aim is to initiate a paradigm shift from a classical landscape to a hybrid or even possibly a fully quantum data analysis protocol.

Primary authors: Mr ZHELNIN, Pavel (Harvard University); Prof. ARGÜELLES-DELGADO, Carlos (Harvard University); Mr LAZAR, Jeff (Harvard University)

Presenters: Mr ZHELNIN, Pavel (Harvard University); Prof. ARGÜELLES-DELGADO, Carlos (Harvard University); Mr LAZAR, Jeff (Harvard University)

Session Classification: Session 6