Contribution ID: **2**   Type: **Oral Presentation**

Qiskit-symb: a Qiskit Ecosystem package for symbolic Quantum Computation

Thursday, 20 March 2025 14:00 (22 minutes)

Qiskit-symb is a Python package designed to enable the symbolic evaluation of quantum states and quantum operators in Parameterized Quantum Circuits (PQCs) defined using Qiskit. This open-source project has been integrated into the official Qiskit Ecosystem platform, making it more accessible to the rapidly growing community of Qiskit users.

Given a PQC with free parameters, qiskit-symb can generate the symbolic representation of the corresponding state vector or unitary operator directly from the Qiskit circuit instance. It leverages the SymPy library for efficient symbolic computations in Python, enabling seamless manipulation of complex mathematical expressions.

Additionally, qiskit-symb provides tools to assist in the development and debugging of Quantum Computing algorithms and Quantum Machine Learning (QML) models. A notable feature is the conversion of PQC objects into bare Python functions, where function arguments correspond to the unbound parameters of the original circuit. This functionality is particularly beneficial for QML applications, allowing users to intuitively simulate quantum circuits with various parameter sets, enhancing the efficiency in tasks requiring multiple executions of the simulation.

Primary author: GASPERINI, Simone (University of Bologna & INFN)

Presenter: GASPERINI, Simone (University of Bologna & INFN)

Session Classification: Artificial Intelligence (AI) - I

Track Classification: Track 10: Artificial Intelligence (AI)