**Title:** From Quantum Picturalism to Interpretrable Quantum AI

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**Abstract:** In 2020 our Oxford-based Quantinuum team performed Quantum Natural Language Processing (QNLP) on IBM quantum hardware [1,2,3]. Key to having been able to achieve what is conceived as a heavily data-driven task, is the observation that quantum theory and natural language are governed by much of the same compositional structure [4,5,6] – a.k.a. tensor structure. Hence our language model is in a sense quantum-native, and we provide an analogy with simulation of quantum systems in terms of algorithmic speed-up. Meanwhile we have made all our software available open-source, and with support [7]. We will also introduce the notion of compositional intelligence, exploiting the fact that the compositional match between natural language and quantum extends to other domains as well, such as patio-temporal perception [8], we will argue that a new generation of AI can emerge when fully pushing this analogy. The so-called ZX-calculus [9,10] for quantum theory (and linear algebra more generally) has been proven to be complete, so can be conceived as a full-bodied reasoning system that go hand-in-hand with modern machine learning.

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