# Accelerating the Quantum Workflow: from Design to Experiments

**Felice Francesco Tafuri**
Philip Krantz, Mohamed Hassan

*Keysight Technologies, 1400 Fountaingrove Pkwy, Santa Rosa, CA 95403, United States*

francesco.tafuri@keysight.com

In this talk we will discuss the latest solutions offered by Keysight to tackle the major challenges faced in the development of quantum systems. Such challenges impose several requirements on both the design tools and the quantum control system. We propose a holistic approach that can solve the development challenges from quantum bit (qubit) design to the measurement of fabricated devices [1, 2]. Our solution includes integrated design tools (Figure 1), excellent signal quality, precise phase coherency, fast real-time processing, and massive scalability to control and read out thousands of qubits (Figure 2). The talk will describe our completely integrated workflow based on the new design software QuantumPro [3] and the high-performance Quantum Control System (QCS) [4] from Keysight.

## References

[1] J. Choi et al., "QuantumPro: An Integrated Workflow for the Design of Superconducting Qubits Using PathWave Advanced Design System (ADS)," 2023 IEEE International Conference on Quantum Computing and Engineering (QCE), Bellevue, WA, USA, (2023), pp. 224-225

[2] M. I. Abdelrahman et al., "Electromagnetic Modeling and Scripted Quantum Parameter Extraction of 3D Superconducting Qubits Using PathWave EMPro," 2023 IEEE International Conference on Quantum Computing and Engineering (QCE), Bellevue, WA, USA, (2023), pp. 352-353

[3] W3037E PathWave QuantumPro https://www.keysight.com/us/en/support/W3037E/pathwave-quantumpro.html

[4] Keysight Quantum Control System (QCS) https://www.keysight.com/zz/en/products/modular/pxi-products/quantum-control-system.html

## Figures

**Figure 1:** Integrated EDA (Electronic Design Automation) tools from circuit design to EM (Electro-Magnetic) simulations and layout.

**Figure 2:** Implementation of a highly scalable modular quantum control system to measure thousands of qubits.