Quantum Science & Metrology

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ABSTRACT

Quantum science introduces both challenges and opportunities in the field of metrology. While the inherently probabilistic nature of quantum systems imposes fundamental limitations on measurement precision, quantum mechanics also provides access to non-classical resources. Quantum metrology exploits these advantages by utilizing quantum systems, properties, or phenomena—such as entanglement, superposition, and squeezing—to achieve measurement sensitivities and accuracies beyond the reach of classical approaches [1].

The exploration of these quantum advantages is an ongoing effort, marking what has been described as the "second quantum revolution" [2]. In this new era, the foundational rules and principles discovered during the first quantum revolution are being applied to develop technologies that surpass their classical counterparts, potentially transforming fields ranging from sensing and imaging to timekeeping and communications.

Aligned with this global trend, FORTH-IESL actively pursues research in quantum science and metrology. I will provide a brief overview of these research activities, which aim to explore and apply quantum principles for advanced measurement techniques. To further support and enhance these efforts, a new Center for Quantum Science & Technologies has been established within FORTH. The Center's goal is to foster collaboration, consolidate expertise, and strengthen quantum research initiatives, positioning FORTH at the forefront of the second quantum revolution.

REFERENCES

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