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Experimental fault-tolerant quantum computation with trapped ions

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Quantum computation at scale requires methods to address the accumulation of errors. Fault-tolerant quantum computing building on top of (i) sufficiently small error rates, (ii) suitable encoding of quantum information across multiple qubits, and (iii) carefully chosen interactions to limit error propagation, allow one to increase the system size without increasing the error rates in the encoded system. In this presentation, building upon theoretical concepts, experimental approaches for fault-tolerant quantum computing with trapped ions, their characterisation, and implementation will be addressed.

Primary author: MONZ, Thomas (University of Innsbruck / AQT)

Presenter: MONZ, Thomas (University of Innsbruck / AQT)

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