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Type: **Talk**

## Quantum technologies with atomic systems

*Monday, 6 May 2024 14:30 (1 hour)*

Ultracold atoms and trapped ions are among the most promising platforms for implementing quantum technologies. On the one hand, neutral atoms form large ensembles of particles that behave coherently at ultra-low temperatures and can be individually confined using optical tweezers. On the other hand, trapped ions form much smaller clouds that can be controlled at the single-particle level. Moreover, the typical depth of the electrical potential used to confine ions ensures a long particle lifetime, with coherence times exceeding one hour having been reported.

In my talk, I will provide an overview of the most recent results and current challenges in the physics of atoms and ions within the quantum technology framework. I will discuss the principles of the methodologies used to manipulate, detect, and entangle ultracold atoms and trapped ions. Finally, I will introduce atom-ion hybrid systems, where ultracold atoms and trapped ions are confined together and made to interact. I will explain how atom-ion interactions represent a promising new tool in quantum technologies.

### Abstract category

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**Session Classification:** Invited contributions