

# Atomtronic circuits: From many-body physics to quantum technologies.

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Atomtronics is the emerging quantum technology of matter-wave circuits which coherently guide propagating ultra-cold atoms. The field benefits from the remarkable progress in micro optics, allowing to control the coherent matter with enhanced flexibility on the micron spatial scale. This way, both fundamental studies in quantum science and technological applications can be carried out. I will sketch recent progress in matter-wave circuitry and atomtronics-based quantum technology. In particular, I will flash on possible applications to a broad range of quantum technologies, from quantum sensing with atom interferometry to future quantum simulation and quantum computation architectures.

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References

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- [1] Luigi Amico, Dana Anderson, Malcolm Boshier, Jean-Philippe Brantut, Leong-Chuan Kwek, AnnacMinguzzi, and Wolf von Klitzing, *Rev. Mod. Phys.* 94, 041001 (2022)