**A novel cooling paradigm:**

**Enhancing atomic clocks and enabling scalable quantum information processing**

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Quantum technologies employing optical clocks hold immense promise for applications such as the redefinition of the second and quantum information processing. In this talk, I will present novel cooling techniques based on narrow-line mediated Sisyphus cooling of alkaline-earth(-like) neutral atoms. These approaches not only enhance the performance of state-of-the-art optical lattice clocks but also provide a new toolbox for next-generation continuous atomic sources. This will pave the way for advances in precision metrology and scalable quantum information processing.