

## Sub-Doppler cooling for ion-based qudits

*Monday 8 July 2024 17:28 (2 minutes)*

An approach to overcome the obstacles of scalability of quantum computers is to use d-level ( $d>2$ ) quantum systems, known as qudits which are inherently present in most quantum computing platforms. While qudits provide significant additional computational resources, the underlying theory on constructing qudit computational primitives and their experimental implementation remain widely unexplored. An essential first step for any computation requires sub-Doppler cooling of the qudits. Here, we design and simulate a cooling scheme for  $^{176}\text{Lu}^+$  which forms a qutrit in its  $^3D_1$  hyperfine levels.

**Author:** FOUKA, Katya (University of Amsterdam)

**Co-authors:** SAFAVI-NAINI, Arghavan (University of Amsterdam); SHANKAR, Athreya (Indian Institute of Science); TAN, Ting Rei (University of Sydney)

**Presenter:** FOUKA, Katya (University of Amsterdam)

**Session Classification:** Poster session

**Track Classification:** Quantum Technologies