International Conference on Quantum Energy 2025 hosted by Dipartimento di Fisica e Astronomia Galileo Galilei an event by ICQE

Contribution ID: **62** Type: **Poster presentation**

Manipulation of trapped ions qudits with structured light

Multilevel quantum system, known as qudits, are the natural generalization of the concept of bits in quantum information. Mastering qudit control can open new avenues in the quantum simulation of complex quantum systems.
I will present a novel scheme based on the use of structured optical beams, dedicated to the control of atomic qudits for quantum simulations.
I will illustrate the advantages of using structured light, our methods for producing engineered beams via the use of nanostructured metasurfaces, and the potential for further integration of this technology in trapped ion chips.

Theme

Theme 3. Theoretical and experimental methods for quantum effects in energy processes

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Track Classification: Theme 3. Theoretical and experimental methods for quantum effects in energy processes