Contribution ID: **21** Type: **Poster**

Towards a Novel Fiber Based Cold Atom Source For Trapped-Ion Experiments

Monday 8 July 2024 16:44 (2 minutes)

In trapped-ion quantum computing, the loading of ions from an oven or an ablation target into a trap releases large numbers of hot atoms into the vacuum chamber, affecting vacuum pressure and depositing on surfaces. Furthermore, the challenge of scalability of quantum computers has led to replacing 4-rod Paul traps by surface traps with a lower depth, making in harder to trap hot ions. The QuantumGuide project aims at offering a simplified and reliable loading of surface ion traps, with an improved vacuum quality. This method relies on a Magneto-Optical Trap (MOT) as a source of cold atoms, and on guiding these atoms through a hollow-core fiber using a dipole trap to help the in-coupling. I present a 3D MOT of ^{40}Ca atoms followed by the realization of a cold atom beam and other steps towards the realization of a dipole trap in a hollow-core fiber.

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Session Classification: Poster session

Track Classification: Quantum Information & Computing