Emergent phenomena with a Bose-Einstein condensate in a traveling-wave optical cavity

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We trap cold rubidium atoms in the optical potential realised by injecting a 4 mirrors traveling-wave cavity with a laser at telecom wavelength. To enhance the atom loading, we use a protocol based on gray molasse [1]. We already obtained a BEC in the cavity by evaporative cooling [2], and we are now trying to condense the atoms using an all-optical scheme.

With the BEC, we plan to study self-ordering phenomena in the ring cavity, where the crystallisation is expected to be described by a continuous order parameter.

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[1] D. S. Naik et al., *Phys. Rev. Res.* 2, 013212 (2020).
[2] D. S. Naik et al., *Quantum Sci. Technol.* 3, 045009 (2018).

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