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## **【515】 Scattering from the dark and birefringent modes: new self-organisation phases**

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A Bose-Einstein Condensate (BEC) inside an optical resonator can undergo a phase transition to a self-organised state when illuminated with a red-detuned pump beam.

In our recent experiment, we explore the blue-detuned case. We observe that self-organisation is still possible despite the atoms being expelled from the light fields. Moreover, the repulsive lattice modifies the inter-band coupling and the dispersive shift triggers dynamics of the order parameter, both effects leading to richer phase diagrams.

In a second experiment, we study the interaction of the BEC with two non-degenerate polarisation modes of a cavity. I will show how the couplings to the modes - independently tuned via the scalar and vector atomic polarisability - give rise to competing self-organisation phases.

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