Un-mixing using lasers to make new crystals

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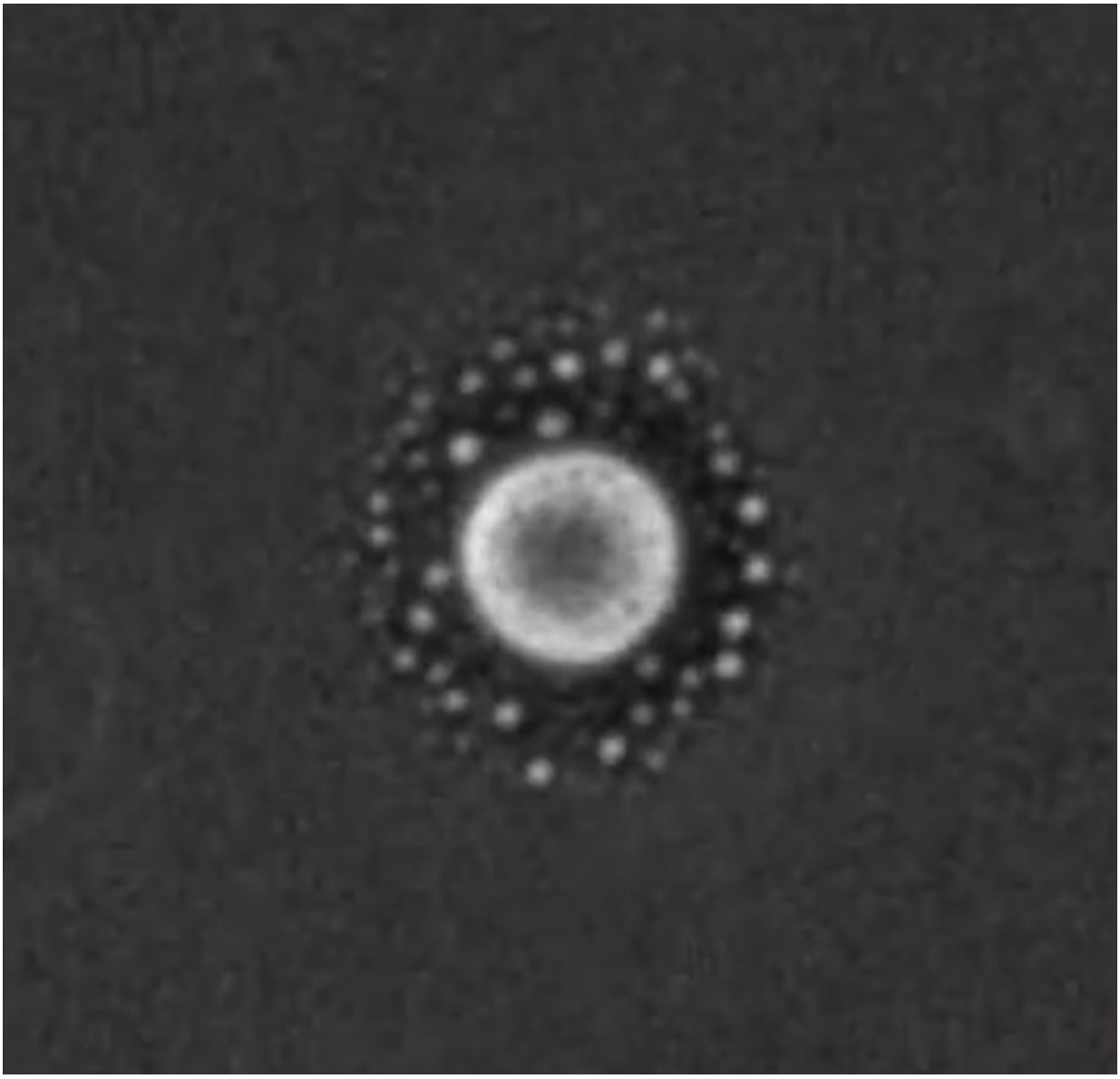

Scientists have managed to separate two liquids in a mixture using a laser, which they claim will lead to new ways of manipulating matter and creating crystals for industry.

In a paper published today in the journal *Nature Chemistry*, researchers from the University of Glasgow present a novel approach to separate and create new phases using a simple laser. The faithful production of crystals is critically important in science and technology as crystals are used in computers, phones, drugs, paints, light bulbs, solar cells, etc. However, producing the right type of crystal is critical. We currently lack the ability to fully control the crystallisation process and this can lead to extremely costly problems in industry.

In the new approach, a laser is used to harness fluctuations associated with a so-called critical point and to drive the system towards a phase separated state. This was demonstrated using a simple liquid mixture.

Prof. Klaas Wynne, who designed and developed the approach, says "In our experiments, we used a simple mixture of two liquids and a relatively low power laser diode to suck one of the liquids out of the mixture. So it's a little bit like making a cup of tea, stirring in some milk, and then using a laser to suck the milk out again. It may seem really counter intuitive but it's all within the laws of physics."

Mr. Finlay Walton, who carried out the work, explains that "These are the first steps towards a full understanding of the role that critical fluctuations play in crystal nucleation. Our aim is to gain full control over nucleation, including the type of crystal that is produced."

The paper titled "Control over phase separation and nucleation using a laser-tweezing potential" is published in *Nature Chemistry*.

More information: Finlay Walton et al. Control over phase separation and nucleation using a laser-tweezing potential, *Nature Chemistry* (2018). DOI: 10.1038/s41557-018-0009-8