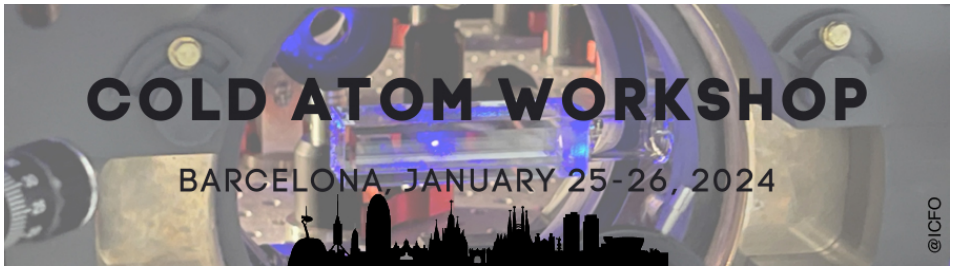

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Supersolid formation time shortcut and excitation reduction by manipulating the dynamical instability

Thursday 25 January 2024 15:40 (20 minutes)

Supersolids are a phase of matter exhibiting both superfluidity and a periodic density modulation typical of crystals. When formed via quantum phase transition from a superfluid, they require a formation time before their density pattern develops. Some protocols/schemes are proposed for experimental applications, building on earlier descriptions of the role roton instability plays in the supersolid formation process and the associated formation time. In particular, the Parachutejump scheme sought to lessen the excitation produced when crossing the phase transition, and the Bang-Bang method sought to shorten the formation time. The proposed schemes are able to fulfill their objectives successfully as both the shortening of the formation process and the reduction of excitation are achieved within the framework of extended Gross Pitaevskii theory.

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