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Measure synchronization in quantum many-body systems HAIBO QIU, College of Science, Xi'an University of Posts and Telecommunications, BRUNO JULIA-DIAZ, MIGUEL ANGEL GARCIA-MARCH, ARTUR POLLS, Departament d'Estructura i Constituents de la Materia, Universitat de Barcelona — The concept of measure synchronization between two coupled quantum many-body systems is presented. In general terms we consider two quantum many-body systems whose dynamics gets coupled through the contact particle-particle interaction. This coupling is shown to produce measure synchronization, a generalization of synchrony to a large class of systems which takes place in absence of dissipation. We find that in quantum measure synchronization, the many-body quantum properties for the two subsystems, e.g. condensed fractions and particle fluctuations, behave in a coordinated way. To illustrate the concept we consider a simple case of two species of bosons occupying two distinct quantum states. Measure synchronization can be readily explored with state-of-the-art techniques in ultracold atomic gases and, if properly controlled, be employed to share quantum correlations between different degrees of freedom.

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