Enhanced Superfluid Response of Parahydrogen in Nanoscale Confinement

Confinement generally has the effect of suppressing order in condensed matter. Indeed, phase transitions such as freezing, or the superfluid transition in liquid helium, occur at lower temperatures in confinement than they do in bulk. We provide here an illustration of a physical setting in which the opposite takes place. Specifically, the enhancement of the superfluid response of parahydrogen confined to nanoscale size cavities is demonstrated by means of first-principle computer simulations. Prospects to stabilize and observe the long sought but yet elusive bulk superfluid phase of parahydrogen in purposefully designed porous media are discussed.

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