## Extremely long nuclear spin relaxation time in quantum dot

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## Abstract

A Dynamic nuclear spin polarization in vertical double quantum dot is studied via the hyperfine interaction between nuclear spins and elecetron spins in the spin blockade region of three electrons. The result shows that both of the polarization directions and rates of nuclear spins depend on the segments in the spin blockade. The experimental observation can be understood as the crossing of quadruplet electron spin states and bouble electron spin states. The nuclear spin relaxation time is also investigated. The results show that the nuclear spin relaxation time increases as temperature decreases, and the nuclear spin relaxation time is extremely long.