

A carbon nanotube quantum dot in the Kondo regime coupled to superconductors

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The electron spin is of central importance in two of the most widely studied many-body phenomena in solid-state physics: the Kondo effect and superconductivity. We have investigated their mutual interplay at the level of a single spin in a carbon nanotube quantum dot. The quantum dot can be changed from a non-Kondo to a Kondo system as the number of electrons on the dot is changed from even to odd and the total spin changes from $S = 0$ to $S = 1/2$. We demonstrate that the Kondo correlations on the dot are not destroyed by the superconductivity if the Kondo temperature, which varies for different single-electron states, exceeds the superconducting gap energy.