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Anomalous decoherence of a nitrogen-vacancy center in a nuclear spin bath¹ REN-BAO LIU, NAN ZHAO, ZHEN-YU WANG, Department of Physics, The Chinese University of Hong Kong — A spin loses its coherence in its noisy environment. It is generally believed that stronger noise causes faster decoherence. Here we show that in a quantum bath, the case can be the opposite. We predict that the double-transition of a nitrogen-vacancy center spin-1 in diamond can have longer coherence time than the single transitions, even though the former suffers twice stronger noise from the nuclear spin bath than the latter. This anomalous decoherence effect is due to manipulation of the bath evolution via flips of the center spin.

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