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Exchange energy in vertically coupled double quantum dots TETSUO KODERA, University of Tokyo, JSPS, YOUSUKE KITAMURA, University of Tokyo, KEIJI ONO, Riken, SHINICHI AMAHA, ICORP, YASUHIRO TOKURA, ICORP, NTT-BRL, SEIGO TARUCHA, University of Tokyo, ICORP, UNIVERSITY OF TOKYO TEAM, JSPS TEAM, RIKEN TEAM, ICORP TEAM, NTT-BRL TEAM — The exchange separation between spin singlet and triplet states was studied for vertically coupled double quantum dots in the Pauli spin blockade regime with the inter-dot level detuning as a parameter. Pauli blockade is established by the formation of an excited but long-lived triplet state in the double dot, and is lifted by a spin flip transition to the singlet state, generating a leakage current. The leakage current shows a step when the Zeeman energy equals the exchange energy thus turning on the flip-flop interaction with the nuclei. The threshold magnetic field increases on approaching the anti-crossing of the two triplets reflecting the increased exchange energy. We present a quantitative comparison of the exchange energy derived experimentally with exact theory.

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