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Carbon Nanotube Superconducting Quantum Interference Device. VINCENT BOUCHIAT, CNRS-Grenoble / Neel Institute, JEAN-PIERRE CLEUZIOU, CNRS- Toulouse /CEMES, THIERRY ONDARCUHU, MARC MONTHIOUX, CNRS - Toulouse /CEMES, WOLFGANG WERNSDORFER, CNRS - Grenoble /Neel Institute — We report on the study of a superconducting quantum interference device (SQUID) with Josephson junctions made of portions of metallic single-walled carbon nanotube [1]. Quantum confinement in each nanotube junction induces a discrete quantum dot (QD) energy level structure, which can be controlled with a lateral electrostatic gate. In addition, a backgate electrode can vary the transparency of the QD barriers, thus permitting to change the hybridization of the QD states with the superconducting contacts [2]. The gates are also used to directly tune the quantum phase interference of the Cooper pairs circulating in the SQUID ring. Optimal modulation of a 6nA supercurrent current with magnetic flux is achieved when both QD junctions are in the "on" or "off" state. Futhermore, the SQUID design establishes that these CNT Josephson junctions can be used as gate-controlled π-junctions. This allow to verify that the sign of the current-phase relation across a proximity coupled Qdot can be reversed with a gate voltage. Noise studies shows that the noise figure of the nanotube SQUID together with the size of the junction should allow the detection of a single molecule magnet. [1] J-P. Cleuziou et al. Nature Nanotec., **1**, 53, (2006). [2] J-P. Cleuziou et al. cond-mat/0610622.

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