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$Bi_2Sr_2CaCu_2O_{8+\delta}$ intrinsic SQUIDs as candidates of high-T_c phase qubits X.Y. JIN, J. LISENFELD, Y. KOVAL, A. LUKASHENKO, A.V. USTINOV, P. MÜLLER, Department of Physics, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erwin-Rommel-Strasse. 1, D-91058 Erlangen, Germany — An intrinsic SQUID is a superconducting ring made of $Bi_2Sr_2CaCu_2O_{8+\delta}$ single crystal, intercepted by two intrinsic Josephson junction stacks. The inductance parameter β_L can be tuned in a wide range by changing the height and the cross-section area of the stacks. When biased with dc current, the device showed typical properties of hysteretic dc-SQUIDs. When a device was coupled with a coil and a Nb readout dc-SQUID, typical rf-SQUID behavior was observed. By choosing a proper reset field, quantum escape from a single minimum has been measured on a sample of $\beta_L \sim 10$. The escape rate can be fine-tuned by applying short pulses down to 1 ns, which allows a fast readout technique. With these prerequisites achieved, our experiments have opened the path to directly using these intrinsic SQUIDs as high-T_c phase qubits. The first attempts to measure Rabi oscillations on these devices will be discussed.

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