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Single-electron transistors have been proposed to be used as a read-out device for Cooper pair charge qubits [1, 2]. We show that a coupled superconducting transistor at the threshold voltage is much more effective in measuring the state of a qubit than a normal-metal transistor at the same voltage range [3]. The effect of the superconducting gap is to almost completely block the current through the transistor when the qubit is in the logical state 1, compared to a mere diminishment of the current in the normal-metal case. The time evolution of the system is solved when the measuring device is driven out of equilibrium, the effect of cotunneling is examined and the setting is analysed numerically for parameters accessible by lithographic aluminium structures.

[1] A.Shnirman and G.Schön, Phys.Rev. (B) 57 (1998) 15400 .

[2] D.V.Averin, quant-ph/0008114.

[3] J.Kinnunen, P.Törmä and J.P.Pekola, condmat/0211154.