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ADDITIONS AND CORRECTIONS

Correction to Probing the Quantum States of a Single Atom Transistor at Microwave Frequencies

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In our paper, we provided an upper bound for the relaxation from the 1s (T_2) excited state to the ground state, Γ_{ES}. This was determined from our estimation that the drain to ground state fast tunnel barrier, Γ_D, was equal to 162 GHz. We have now realized that in Figure 5g of the paper, where the transport mechanisms that allowed the observation of the excited state signature are schematically explained, we neglected to consider the process where an electron tunnels from the drain to the ground state (see green arrow in Figure 1 below).

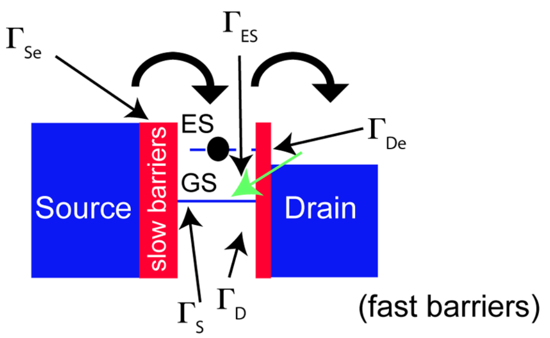

Figure 1. Schematic of the processes that allow the observation of the excited state spectroscopy signature of current in Figure 5b of the paper. In green, the previously neglected relaxation process where an electron tunnels from the drain to the ground state is shown.

This neglected process can lead to blockading of the loading of the excited state, which no longer contributes to a net current through the single atom transistor. The fact that we nevertheless observe the excited state resonance in the experiment suggests that the rate for this loading (*i.e.*, Γ_D) is not greater than the source to excited state (Γ_{Se}) as previously estimated and is much smaller than 162 GHz. It does, however, indicate that these two rates are of the same order of magnitude, and the competition between the two processes contributes to the observed current (4 pA). This interpretation is a minor adjustment to that given in the paper, only requiring Γ_{Se} and Γ_D being of the same order of magnitude while being much smaller than Γ_{ES}. In this new interpretation of the data, the estimation of the source to ground state slow tunnel barrier, Γ_S, being much smaller of Γ_D is confirmed. The same applies for the lower bound for Γ_{ES} obtained in the paper and discussed in the abstract. However, it is no longer possible to estimate an higher bound for the value of the Γ_{ES}, which was previously stated as 162 GHz.

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