Erratum: Dynamics of nonequilibrium electrons on neutral center states of interstitial magnesium donors in silicon [Phys. Rev. B **94, 075208 (2016)]**

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A recent mistake in our paper has been found, namely, a missing factor in the last exponential decay function in the equation describing population of the second state in the case of a four-level decay. The correct equation is as follows:

$$n_2(t) = n_4(0) \frac{W_{32}W_{43}}{W_{32} - W_{43}} \left(\frac{e^{-W_{43}t}}{W_{21} - W_{43}} - \frac{e^{-W_{32}t}}{W_{21} - W_{32}} + \frac{W_{32} - W_{43}}{W_{21} - W_{43}} \frac{e^{-W_{21}t}}{W_{21} - W_{32}} \right), \quad (6)$$

Then, the fitting of the experimental data with the four-level model results in the lifetime of the $2p_{\pm}$ state $\tau_{43} = W_{43}^{-1} \approx 560 \pm 60$ ps and a maximum population of the $2p_{\pm}$ state of $n_4(0)/N \approx 4.4 \times 10^{-4}$ [Fig. 6(b)], accepting fixed values $\tau_{32} = W_{32}^{-1} \approx 270$ and $\tau_{21} = W_{21}^{-1} \approx 1700$ ps, derived for the $2p_0$ state.

Similar to the results in the original paper, one can see clearly that the chosen four-level model for the decay of the $2p_{\pm}$ state results in the large deviation of the fit to the experimental data at long delays that requires significantly larger time τ_{21} . Therefore, the four-level model cannot be considered as a valid description for the observed relaxation. The characteristic time of about 530 ps required for accurate fitting of the experimental data in the three-level model is close to the 560-ps value derived from the four-level fit. This value describes the first relaxation step, i.e., decay of the $2p_{\pm}$ state of the Mg^0 center in Si as has been stated in the original paper.

None of the other figures (except for the shown Fig. 6) or results of our paper are affected by the mistake.

FIG. 6. Pumping the Mg^0 $1s(A_1) \rightarrow 2p_{\pm}$ transition. (a) Typical behavior of the pump-probe signal and a four-level model [staircase relaxation $2p_{\pm} \rightarrow 2p_0 \rightarrow 1s(E, T_2) \rightarrow 1s(A_1)$] fit with two relaxation times fixed as determined in the fit for the $2p_0$ state in Fig. 4(b). (b) Population dynamics as derived in the frame of the four-level model.