**Cheng *et al.* Reply:** In the preceding Comment [1], Zheng finds errors contained in the matrix expressions of the phenomenological damping terms $\Gamma$ and $\Lambda$ in our Letter [2], and provides corrected expressions. However, the equations used in the simulations compared against the experimental data [Figs. 3(d) and 3(e) of the original Letter] actually used the correct coefficients mentioned in the Comment, with an added generalization. The generalized coefficients are

$$\Gamma_{77} = (4/3)\gamma_x + \gamma_{xy} - \gamma_y/3,$$
$$\Gamma_{78} = (-2/3)\gamma_x - \gamma_{xy} + (2/3)\gamma_y,$$
$$\Gamma_{87} = (2/3)\gamma_x - \gamma_{xy} - (2/3)\gamma_y,$$
$$\Gamma_{88} = (-1/3)\gamma_x + \gamma_{xy} + (4/3)\gamma_y.$$

We regret the error in the published formulas which should have been found during the proof stage of the manuscript. A subsequent detailed theoretical analysis [3] uses the same equations and is correctly printed.

The numerical values of the parameters used in the simulations are $\gamma_x = 1/12 + 0.1I_1(t) + 0.8I_2(t)$, $\gamma_y = 1/18 + 0.1I_1(t) + 1.1I_2(t)$, and $\gamma_{xy} = 1/500 + 1.5I_1(t) + 2I_2(t)$, where $I_1(t) = 0.0204\,\mathrm{sech}^2[1.76(t - t_{01})/6]$ and $I_2(t) = I_{02}\,\mathrm{sech}^2[1.76(t - t_{02})/6]$ are the excitation intensities of the first and the second pulse, respectively. There are two points to note about the parameters: (i) We adopted intensity-dependent decay and dephasing rates as a phenomenological approximation to the real dephasing processes in semiconductor quantum dots (SQDs) in a way similar to that in Refs. [4,5], and (ii) $\gamma_{xy}$ is an effective spin cross-relaxation rate which contains the contributions related to the dipole transitions ($\gamma_{xy}^{\mathrm{dipole}}$) and other dephasing processes in SQDs ($\gamma_{xy}^{\mathrm{ph}}$), combined as $\gamma_{xy} = \gamma_{xy}^{\mathrm{dipole}} + \gamma_{xy}^{\mathrm{ph}}$. The spin cross relaxation induced by the dipole transitions is zero in our V-type system due to the orthogonal polarizations of states $|x\rangle$ and $|y\rangle$ as Zheng correctly points out. But there is spin cross relaxation caused by phonon processes [6] and other multilevel transitions [7], resulting in a nonzero $\gamma_{xy}^{\mathrm{ph}}$. The latter mechanism provides an external path for polarization losses and is intensity dependent [7].

Finally, we want to emphasize that the way the intensity-dependent dephasing rates were included is actually a simplification, using modified rate equations to include the processes mentioned above. This simplification seems justified since the simulations qualitatively reproduced our experimental observations and the goal of the Letter was not a detailed study of the dephasing and decay mechanisms but rather to show a controlled swap between the $|x\rangle$ and $|y\rangle$ populations. But we should mention that these simplifications do not provide a complete physical understanding of the complex dephasing effects caused by phonon relaxation and other multilevel transitions [6,7]. A more suitable method to address the complex dephasing in SQDs is to introduce the intensity-dependent pure dephasing in the dissipation terms of the master equations, which will be discussed elsewhere.

M. T. Cheng,[1] P. Bianucci,[2] A. Muller,[2] H. J. Zhou,[1]
Q. Q. Wang,[1] and C. K. Shih[2]
[1]Department of Physics
Wuhan University
Wuhan 430072, People's Republic of China
[2]Department of Physics
University of Texas at Austin
Austin, Texas 78712, USA

Received 10 December 2007; published 23 July 2008
DOI: 10.1103/PhysRevLett.101.049702
PACS numbers: 78.67.Hc, 42.50.Hz, 78.47.−p, 78.55.−m

[1] Y. Zheng, preceding Comment, Phys. Rev. Lett. **101**, 049701 (2008).
[2] Q. Q. Wang, A. Muller, M. T. Cheng, H. J. Zhou, P. Bianucci, and C. K. Shih, Phys. Rev. Lett. **95**, 187404 (2005).
[3] M. T. Cheng, H. J. Zhou, S. D. Liu, Q. Q. Wang, and Q. K. Xue, Solid State Commun. **137**, 405 (2006).
[4] J. M. Villas-Boas, S. E. Ulloa, and A. O. Govorov, Phys. Rev. Lett. **94**, 057404 (2005).
[5] Q. Q. Wang *et al.*, Phys. Rev. B **72**, 035306 (2005).
[6] T. H. Stievater, X. Li, T. Cubel, D. G. Steel, D. Gammon, D. S. Katzer, and D. Park, Appl. Phys. Lett. **81**, 4251 (2002).
[7] Q. Q. Wang, A. Muller, P. Bianucci, C. K. Shih, M. T. Cheng, H. J. Zhou, and J. B. Han, Appl. Phys. Lett. **89**, 142112 (2006).

 