Pulse-gated quantum dot hybrid qubit\textsuperscript{1} S.N. COPPERSMITH, TECK SENG KOH, JOHN KING GAMBLE, M.A. ERIKSSON, MARK FRIESEN, Department of Physics, University of Wisconsin-Madison — A quantum dot hybrid qubit formed from three electrons in a double quantum dot has the potential for great speed, due to presence of level crossings where the qubit becomes charge-like. Here, we show how to exploit the level crossings to implement fast pulsed gating. We develop one- and two-qubit dc quantum gates that are simpler than the previously proposed ac gates \cite{1}. We obtain closed-form solutions for the control sequences and show that the gates are fast (sub-nanosecond) and can achieve high fidelities.


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