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	Generation of all-to-all connections in a two-dimensional qubit array with two-body interactions
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	All-to-all connections are required in general quantum annealing machines to solve various combinatorial optimization problems. The Lechner, Hauke, and Zoller (LHZ) method, which is used to realize the all-to-all connections, requires many-body interactions in locally connected qubits. Because most of the qubit interactions are two-body interactions, Lechner also proposed the construction of each four-body interaction by six controlled-NOT (CNOT) gates between two qubits. However, it is difficult to construct many CNOT gates. Herein, we show more concrete sequences to produce four-body and three-body interactions based on a two-dimensional solid-state qubit system. We show that the number of operations needed to construct the many-body interactions can be reduced using appropriate pulse sequences. These findings will help reduce quantum computation costs for solving combinatorial problems. *This work was partly supported by MEXT Quantum Leap Flagship Program (MEXT Q-LEAP) Grant Number JPMXS0118069228, Japan.