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Adiabatic Qubits¹ Resonant Passages of Spin SANGCHUL OH, Department of Physics, University at Buffalo, The State University of New York, YUN-PIL SHIM, MARK FRIESEN, Department of Physics, University of Wisconsin-Madison, XUEDONG HU, Department of Physics, University at Buffalo, The State University of New York — We study adiabatic quantum teleportation through a spin chain with XX and Heisenberg couplings. We show that an adiabatic quantum teleportation protocol on a three-spin chain can be mapped exactly onto two parallel and coherent adiabatic passage channels, one for each spin orientation. When the time evolution is non-adiabatic, the information transfer displays a series of resonances where perfect transmission fidelity is achieved. This resonant operation is both fast and robust, indicating a possible new route for implementing robust quantum gates between spin qubits.

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