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Design of many-body spin states of Rydberg atoms excited to highly tunable magnetic sublevels SVETLANA MALINOVSKAYA, Stevens Institute of Technology — Quantum control methodology is presented to design many-body spin states in a spin chain of Rydberg atoms using laser pulses and the magnetic field. Two-photon ladder type configuration is implemented, which is advantageous due to a combined action of the one-photon and two-photon detunings as control parameters. Many-body spin states are designed of an ensemble of spins encoded in sublevels of Rydberg states and interacting through the van der Waals interactions.

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