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How to control spin-Seebeck current in a metal-quantum dot-magnetic insulator junction. HUA-HUA FU, LEI GU, RUQIAN WU, Department of Physics and Astronomy, University of California, Irvine — The control of the spin-Seebeck current is still a challenging task for the development of spin caloritronic devices. Here, we construct a spin-Seebeck device by inserting a quantum dot (QD) between the metal lead and magnetic insulator. Using the slave-particle approach and noncrossing approximation, we find that the spin-Seebeck effect increases significantly when the energy level of the QD locates near the Fermi level of the metal lead due to the enhancement of spin flipping and occurrences of quantum resonance. Since this can be easily realized by applying a gate voltage in experiments, the spin-Seebeck device proposed here can also work as a thermovoltaic transistor. Moreover, the optimal correlation strength and the energy level position of the QD are discussed to maximize the spin-Seebeck current as required for applications in controllable spin caloritronic devices.

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