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Effects of Magnetic Impurities in Quasi-One-Dimensional Magnets MUNEHISA MATSUMOTO, Department of Physics, Graduate School of Science, Tohoku University, Sendai 980-8578, HAJIME TAKAYAMA, Institute for Solid State Physics, University of Tokyo, Kashiwa 277-8581 — In the low-dimensional gapped magnets such as $CuGeO_3$ and $PbNi_2V_20_8$, doping effects of non-magnetic impurities have been studied and novel order-by-disorder phenomena such as the non-magnetic-impurity-induced phase transitions have been found. Recently, the effects of magnetic impurities was experimentally investigated in the Haldane material $PbNi_2V_2O_8$ and the impurity-induced transition temperature was found to have strange non-monotonic dependence on the magnitude of the impurity spin. Motivated by this recent progress, we study the non-magnetic and magnetic impurity effects in the gapped quasi-one-dimensional system, namely, the weakly coupled spin-1 antiferromagnetic Heisenberg chains on a simple cubic lattice. We utilize the quantum Monte Carlo method with the continuous-time loop algorithm and determine numerically the impurity-induced transition temperature for the systems with non-magnetic impurities and also with the magnetic impurities with spin magnitude $S = 1/2$, $3/2$, 2, and $5/2$. Our simulation results are compared to the experimental data and the picture for the impurity-induced ordered state is discussed.

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