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Dynamic Properties of 1-D Ising Chain in a Random Transverse Field[1] XUN JIA, SUDIP CHAKRAVARTY, Department of Physics, University of California at Los Angeles — We considered a one dimensional spin-1/2 Ising chain in a random transverse magnetic field. Dynamic structure factor $S(k, \omega)$ at $T = 0$ is numerically computed by mapping to Jordon-Weigner fermions. Two types of distributions of magnetic fields are introduced into our model. With rectangular distribution, single branch of dispersion relation is observed, and disorder tends to broaden the dispersion peak and close the excitation gap. With a binary distribution, a non-dispersing branch at almost zero energy is recovered. This is reminiscent of neutron scattering measurement in $LiHoF_4$, although this is a three-dimensional system with long-range dipolar coupling between the electronic spins, which are in turn coupled to the nuclear spins through the hyperfine interactions. The implications of this similarity will be discussed.

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