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**Spin echo probe of quantum criticality in the one-dimensional transverse-field Ising model** SHAOWEN CHEN, KE CHEN, RENBAO LIU, Department of Physics, The Chinese University of Hong Kong — We study the detection of quantum phase transition in the one dimensional transverse-field Ising model. In the model, we attach a spin-1/2 to the Ising spin chain as a probe and study the decoherence behavior of the probing spin with spin echo techniques. We evaluate the effective spectrum density of the local field that the Ising spin chain impart to the probing spin and identify the contributions from the thermal fluctuations and quantum fluctuations to the probe spin decoherence. The output of our work provides a better understanding of the quantum phase transition of this model. This work is supported by Hong Kong RGC/GRF Project CUHK 402410 and NSFC/RGC Joint Project N\_CUHK403/11.

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