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Non-magnetic disorder effects on 3-dimensional Z_2 quantum spin Hall systems RYUICHI SHINDOU, RIKEN (the Institute of Physical and Chemical Research), SHUICHI MURAKAMI, Tokyo Institute of Technology — Motivated by the recent discovery of the Z_2 quantum spin Hall insulator (QSHI) in the antimony doped bismuth, we have studied the non-magnetic disorder effects onto the quantum critical point (QCP) which always exists between an ordinary insulator and the Z_2 QSHI. Namely, intervening the topologically distinct states of matter, such QCP should be generally stable against any perturbations (i.e. disorders), as far as the time-reversal symmetry is preserved. In this talk, I will present a possible microscopic mechanism of this stability, based on simple weak-localization calculations. Specifically, at the QCP between the topological insulator and an ordinary insulator, so-called the *parity* degree of freedom also becomes the conserved quantity, in addition to the usual charge. As a result of this, the diffuson near the QCP consists of the *two* quasi-degenerate dominant contributions having the diffusion poles; one contributes to the usual charge diffusion, while the other is ascribed to the *parity diffusion*. In terms of these two quasi-degenerate low-energy modes, I will construct a possible microscopic picture for the stability of the QCP against no-magnetic disorders.

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