ON FAULT-TOLERANT GROUND STATE QUANTUM COMPUTATION

ARI MIZEL, LABORATORY FOR PHYSICAL SCIENCES

In the standard picture of quantum computation, bits are spatially-localized, time-dependent two level systems. In a classical digital circuit, bits are spatially-extended, time-independent patterns of voltage.

In this talk, we argue that spatially-extended, time-independent bits possess stability advantages and show how to frame ground state quantum computation based upon this observation. We note that ground state quantum computation implies universal adiabatic quantum computation as an immediate corollary and then pay special attention to issues of fault-tolerance.

References