**Logic Operations Using the Zeno Effect** BRYAN JACOBS, Johns
Hopkins University, JAMES FRANSON, UMBC, JHU/APL COLLABORATION,
UMBC COLLABORATION — The quantum Zeno effect can be used to implement
quantum logic operations using single photons as the qubits. In this context the
Zeno effect is used to inhibit failure events that would otherwise occur in a linear
optics system. In practice, no actual measurements are required and equivalent
results can be obtained using strong two-photon absorption to inhibit the growth
of undesired probability amplitudes. It is shown here that similar effects can be
used to implement classical logic and memory devices. In these devices nonlinear
dissipation is used to prevent the buildup of an electromagnetic field in a resonator.
Aside from their potential practical applications, these results show that the Zeno
effect is a possibility in any system characterized by a wave equation.

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