

1077-93-1544

**Lorenza Viola\*** ([Lorenza.Viola@Dartmouth.edu](mailto:Lorenza.Viola@Dartmouth.edu)), Department of Physics and Astronomy,  
Dartmouth College, Hanover, NH 03755. *Engineering Pointer States in Open Quantum Systems.*

Pointer states have both a long history in fundamental quantum theory and a practical relevance as long-lasting high-fidelity states in open quantum systems. For generic dissipative dynamics, however, pointer states need not exist or, when they do, need not coincide with states of practical interest. I will show how open-loop control procedures may be used to engineer dissipation in such a way that any desired initial pure state can be guaranteed to survive with high minimum fidelity over time and retrieved on demand. Quantitative fidelity bounds and constructive synthesis protocols will be presented, and validated through simulation in paradigmatic single- and two- qubit dissipative scenarios. The relationship to recent dynamical decoupling experiments will also be elucidated. (Received September 20, 2011)