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Toy models for scalar QED and gravitational decoherence QIDONG XU, MILES BLENCOWE, Dartmouth Coll — We investigate the dynamics of two quantum mechanical oscillator system-bath toy models obtained by dimensionally truncating scalar QED and linearized gravity coupled to a massive scalarfield. The scalar QED toy model approximately maps onto an oscillator system subject to two-photon damping, while the scalar-gravity toy model maps onto the phase damped oscillator. The toy models provide useful insights into solving for open system quantum dynamics relevant to thefull scalar QED and weak gravitational field systems, in particular the decoherence of initial scalar field system superposition states.

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