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Detection of the many-body topological invariant in a driven, dissipative spin model MICHAEL FLEISCHHAUER, DOMINIK LINZNER, Dept. of Physics and research center OPTIMAS, Univ Kaiserslautern — Systems with topological order have attracted a growing interest in recent years as they have been associated with exotic, strongly correlated quantum states and can possess protected edge states. Engineering dissipative driven quantum systems with a topologically ordered stationary state could circumvent the problem of preparing topological states as encountered in weakly gapped closed systems. Moreover, the stationary state of an open system is an attractor of the dynamics which ensures additional robustness against fluctuations, decoherence and even particle losses. While topological states in closed systems are by now reasonably well understood, at least if non-interacting systems are considered, the concept of topology in open systems is still in its infancy. We here propose and discuss a conceptual detection scheme for topological properties of a one-dimensional dissipative spin chain by coupling it to a well understood closed system. The presence of topological order of the non-gaussian steady state in the dissipative spin chain induces a non-trivial topology in the closed system resulting in a quantized charge pump. Using this we are able to introduce a topological invariant with a clear physical meaning.

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