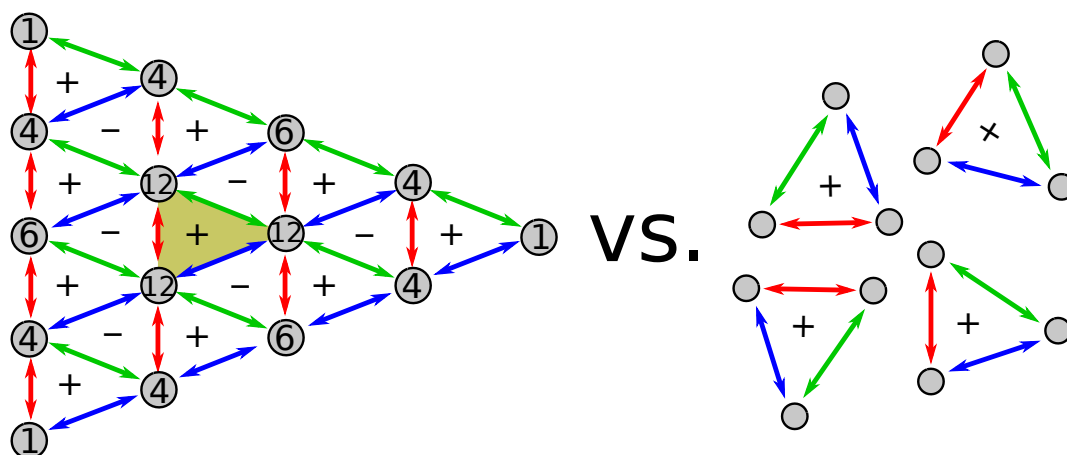




# Quantum boost of collective chilling

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A single qutrit with transitions selectively driven by weakly-coupled reservoirs can implement one of the world's smallest refrigerators. We analyze the performance of  $N$  such fridges that are collectively coupled to the reservoirs. We observe a quantum boost, manifest in a quadratic scaling of the steady-state cooling current with  $N$ . As  $N$  grows further, the scaling reduces to linear, since the transitions responsible for the quantum boost become energetically unfavorable. Fine-tuned inter-qutrit interactions may be used to maintain the quantum boost for all  $N$  and also for not-perfectly collective scenarios.

D. Kolisnyk and G. Schaller, *Performance boost of a collective qutrit refrigerator*,  
<https://arxiv.org/abs/2210.07844>