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Entanglement Entropy in Critical Harmonic Chains with Even Dynamical Exponents LAYLA HORMOZI, Joint Quantum Institute, NIST and University of Maryland, NICK BONESTEEL, KUN YANG, Department of Physics and NHMFL, Florida State University — We study the behavior of the entanglement entropy in a chain of coupled harmonic oscillators at the critical regime and in the absence of conformal symmetry. We consider a specific class of the so-called “squared” interactions [1], namely interactions leading to the dispersion $\omega_k = (2\text{Sin}(k/2))^z$ with even dynamical exponent, z , in which up to the z^{th} nearest neighbors are coupled. Similar to the conformally symmetric case, we find a logarithmic scaling for the entanglement entropy, with a coefficient that can be calculated analytically and depends only on z .

[1] M. B. Plenio, J. Eisert, J. Dreißig, and M. Cramer, Phys. Rev. Lett. **94**, 060503 (2005)

Layla Hormozi
Joint Quantum Institute, NIST and University of Maryland

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