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**Sound and Noisy Light: Tuning Phonon Modes in Photo-switchable Nanostructures** SOPHIA SKLAN, JEFFREY GROSSMAN, Massachusetts Inst of Tech-MIT — The coupling of light to structural vibrations is well known and results in phenomena like phonon polaritons, acousto-optics (where phonons modulate optical properties), and optomechanics (where light creates or absorbs phonons). Here we consider the question of whether light could also be used to modulate the properties of phonons. We examine photo-isomers (which change their shape under exposure to light), embedded in a nanostructure designed to amplify the effects of photo-switching. To isolate the effects of photo-isomerization (jump photo-switching and shot noise), we apply a combination of analytic and computational techniques to analyze the stochastic dynamics of a toy model of this system. Particular attention is paid to applying this model to explore the potential applications of the photo-switchable nanostructure.

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