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Soundtracks to Accompany Visualizations of Nuclear Pasta Simulations[1] EMILY CLARK, Bates College and Indiana University — Nuclear pasta is a substance found in neutron stars and core-collapse supernovae, arising at the extreme densities near nuclear saturation, when the attractive nuclear and repulsive coulomb forces mold the dense sea of protons and neutrons into shapes such as spheres, tubes, and slabs, which somewhat resemble different types of pasta. The structures are analyzed using molecular dynamical simulations for different proton fractions, temperatures, densities, and number of nucleons. The system is stressed by stretching it, squeezing it, or subjecting it to some outside force. In order to obtain a more complete representation of how the nuclear pasta responds, sound tracks were produced to accompany videos of stretching simulations. The audio tracks were made by assuming sound waves are produced from changes in the nucleon density. This density was calculated within a small region at frequent time intervals during the run. The resulting sound track was then synced with a video of the run in order to emphasize the development of the system as the pasta moves and breaks.

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