

Abstract Submitted  
for the TSF21 Meeting of  
The American Physical Society

**Using LED light strips to artistically represent a Fourier Transform and the Heat equation in one dimension** FRANCISCO HOLGUIN, JAMES CLARAGE, University of St. Thomas — LED lights are now commodified, resulting in low-cost applications in areas as diverse as domestic kitchen lighting, art installations, computer screens, etc. We present efforts to use commercial LED one-dimensional light-strips to illuminate understanding, and aesthetic appreciation, of the complex numerical outputs generated in physics. In our work, we first map a discrete Fourier transform of different audio signals to a colormap, which we then display on an LED color strip to visualize the transform. The output from the LED is rich in color, allowing us to see how frequencies make up an audio signal over time. We also run a Heat Equation simulation, with different initial conditions, for different materials. When the Heat Equation updates, the output is color mapped and displayed on the LED strip, allowing one to visualize how heat would distribute in real and simulated time. In our interdisciplinary age, this project demonstrates how students may blend their various studies in physics, engineering, computer science, mathematics, with current electronic media technologies of visual art and music.

Francisco Holguin  
University of St. Thomas

Date submitted: 09 Sep 2021

Electronic form version 1.4