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Spurious Acceleration Noise on the LISA Spacecraft Due to Solar Irradiance[1] BRANDON PIOTRZKOWSKI, BARRET FRANK, BRETT BOLEN, Grand Valley State Univ, SHANE LARSON, Northwestern Universirty — The Laser Interferometer Space Antenna (LISA) is a configuration of three satellites that will precisely measure the distance between each other in order to detect gravitational waves. Therefore, the stability of LISA satellite configuration will be crucial to its ability to measure gravitational waves, as will understanding the noise introduced in the measured gravitational wave signal from various environmental accelerations. Although solar irradiance will certainly be a large source of noise in the desired frequency band and will attempt to disrupt the satellite configuration, previous research has only considered zeroth order calculations of force by irradiance in static systems. To remedy this, we used a geometric and material based approach to calculate the force on the satellites' solar arrays, the only component facing the sun. Running our simulation of LISA based on irradiance data from the VIRGO (Variability of solar IRadiance and Gravity Oscillations) satellite, we examined the Fourier transform of force to find the associated acceleration noise within in the LISA frequency band due to solar irradiance. This research will help isolate the gravitational wave signal when LISA is flown.

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