

Abstract Submitted  
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**DIY Astrophysics: Examining diurnal and seasonal fluctuations in the effects of solar gravity using a three-axis accelerometer** KRISTINE ROMICH, ANDREW KRUGER, City Colleges of Chicago — On the surface of the Earth, the acceleration due to the influence of the Sun’s gravity is approximately 0.06% of that due to the Earth’s own gravity ( $0.0006g$ ). Nevertheless, it may be detected using a sensitive three-axis accelerometer such as the InvenSense MPU-6050, which is compatible with low-cost microcontrollers such as the Arduino and Raspberry Pi and hence provides an affordable means of investigation. Unlike the gravitational force between the Earth and an object on its surface, the  $x$ -,  $y$ -, and  $z$ -components of the gravitational force between the Sun and an earthbound observer are not constant: the vector direction of the gravitational acceleration caused by the Sun — denoted  $g_{\odot}$  — fluctuates as a function of the Earth’s rotation (i.e., the time of day) and position in orbit (i.e., the time of year). The present investigation derives mathematical expressions for the instantaneous value of each component of  $g_{\odot}$  in terms of both quantities. It also outlines a method of using the InvenSense MPU-6050 to detect the corresponding fluctuations in total gravity (and, thus, the influence of the Sun’s gravity) experimentally.

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