

Physics 524 Week 4 Homework Exercises

Due: Tuesday 9/19/2023 at 10am

Due date reminder, etc.

Please email your completed assignment to the course TA by Tuesday, 10 am of next week. Assignments that are late by at most one week will receive at most 50% of full credit. We will not grade anything submitted more than one week late.

Your homework submissions—code, cell phone photos, etc. must include enough identifying information for us to tell who you are!

1. *SparkFun*

Please read all three SparkFun tutorials listed below:

- Serial Communication: <https://learn.sparkfun.com/tutorials/serial-communication>
- I2C: <https://learn.sparkfun.com/tutorials/i2c>
- Serial Peripheral Interface (SPI): <https://learn.sparkfun.com/tutorials/serial-peripheral-interface-spi>

2. *SPI vs I2C speeds*

Figure out how to disable the VOC measurement on your BME680s. Turn off all Serial.print statements in loop except for an initial print announcing your intentions and a final one giving your result. Compare how long it takes to read the BME680 100 times using I2C and SPI. Yeah, SPI is much faster, but only if your device's time to perform a measurement is small compared to the time to execute an I2C or SPI instruction!