Week of 6-3-24

Largely this week has consisted of gaining familiarity with some background knowledge for the project (basics of machine learning, unfamiliar quantities and jargon, etc.) and some first steps with things that may be used later (simulation of the system of interest in the cyclotron facility using the Opal software package).

As of right now, it seems that the project will involve the usage of Pepper Pot Emittance Monitors (PPEMs) and the machine learning element will pertain to optimizing beamline trajectory parameters using data collected with the PPEMs. The aforementioned Opal simulation will likely be used in order to determine the ideal parameters for the beamline trajectory ("goal" parameters to feed to the machine learning algorithm). I'll share more information as it comes, but it seems that only the rough trajectory of the project has been determined as of now.

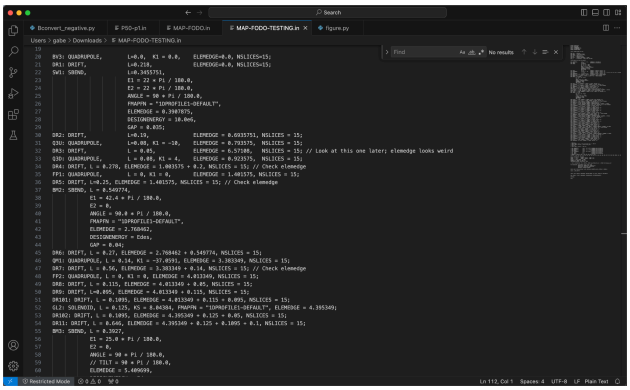

Fig. 1: Screenshot of some of the code used for the Opal simulation. Due to some compatibility issues, no simulated data has yet been collected, but most of the errors have already been fixed.

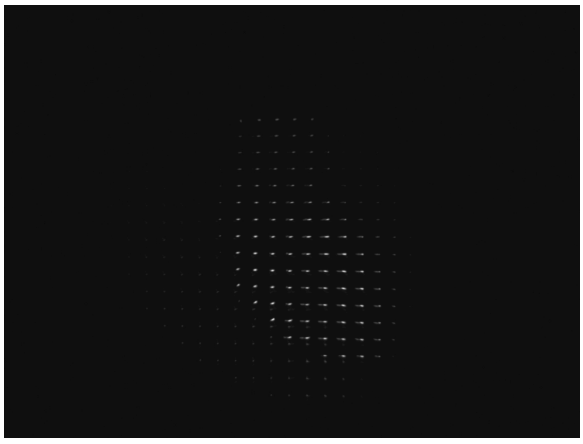

Fig. 2: Example of an image obtained via the PPEM analysis process; depending on whether or not some old code is still available, I may have to write a quick Python script to perform the analysis on these images.