Rapid Screening of Samples via Ion Beam Analysis ROBERT BARTSCH, JINGXU XIE, GUNNAR BROWN, GRAHAM PEASLEE, University of Notre Dame — The Peaslee lab group uses Particle-Induced Gamma Emissions and Particle-Induced X-ray Emissions to analyze many environment and consumer products for elements of concern. This is done rapidly and efficiently by bringing the proton beam out of vacuum and into air, thus circumventing any need to pump the samples down into vacuum. Most of the time, our analysis is searching for Polyfluoroalkyl Substances (PFAS) or other harmful fluorine-containing chemicals in the samples. Such chemicals are dangerous carcinogens often produced as by-products in industrial processes, or even desired for they are useful for water-proofing materials and for some fire-fighting foams. Despite our recording of both the x-ray and gamma spectras, we often only analyze the fluorine peaks, for it was too labor intensive with our existing analysis programs to identify all of the elements that could be observed in all of our spectras. To improve our data analysis, I built a Matlab program, based on work by a previous student, Jingxu Xie, to rapidly find and identify all peaks in the spectras, running entire folders worth of spectra at a time. It operates at mere seconds per spectra and generates an excel spreadsheet with all the analyzed data, requiring minimal labor to operate.

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