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Ion-Beam Analysis of Airborne Pollution CHARLES HARRINGTON, COLIN GLEASON, KATIE SCHUFF, MARIA BATTAGLIA, ROBERT MOORE, COLIN TURLEY, SCOTT LABRAKE, MICHAEL VINEYARD — An undergraduate laboratory research program in ion-beam analysis (IBA) of atmospheric aerosols is being developed to study pollution in the Capitol District and Adirondack Mountains of New York. The IBA techniques applied in this project include proton induced X-ray emission (PIXE), proton induced gamma-ray emission (PIGE), Rutherford backscattering (RBS), and proton elastic scattering analysis (PESA). These methods are well suited for studying air pollution because they are quick, non-destructive, require little to no sample preparation, and capable of investigating microscopic samples. While PIXE spectrometry is used to analyze most elements from silicon to uranium, the other techniques are being applied to measure some of the remaining elements and complement PIXE in the study of aerosols. The airborne particulate matter is collected using nine-stage cascade impactors that separate the particles according to size and the samples are bombarded with proton beams from the Union College 1.1-MV Pelletron Accelerator. The reaction products are measured with SDD X-ray, Ge gamma-ray, and Si surface barrier charged particle detectors. Here we report on the progress we have made on the PIGE, RBS, and PESA analysis of aerosol samples.

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