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Development of an external ion beam system for PIXE analysis

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Ion Beam Analysis (IBA) is a family of analytical techniques used for material characterization. It probes a material for atomic composition and concentration along its surface and to depths of the order of a few microns, depending on the type and energy of the probing beam. We have installed at the Bucharest 3 MV tandemtron a micro-beam scanning system that can use Rutherford back-scattering(RBS), PIXE or PIGE to characterize surfaces. Either one or a combination of of these techniques can give information about the elemental/isotopic composition and concentration across surfaces. By using ion beams with diameters of a few microns we scan the surface of a target material and determine atomic concentration maps with this resolution. The images we construct yield rich detail and offer information about internal structure and composition, in particular for composite and non-uniform materials. The characteristics for the setup are described with examples from typical applications.

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