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Ion Microscopy

The classical optical microscopy uses photons and its resolution is wavelength-limited. With electrons instead of photons atomic resolution is possible in transmission of ultra thin samples. Ions like protons or alpha-particles are advantageous for thicker samples due to their better penetration. Both charged particle techniques yield element-specific image and have analytical applications. The quantification and the detection limits are much better for heavier particles. Examples for high-resolution experiments in the transmission mode with scanned proton beams and lateral resolution in the 100 nm range obtained with the new facility at Leipzig LIPSION will be given for thin semiconductor layers, aerosol particles, and cartilage samples. The method of ion luminescence will be illustrated with ancient human bone samples.