

Measurement of Low Energy Ion Tracks in CR-39 Plastic with An Atomic Force Microscope*

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We demonstrate that an atomic force microscope allows one to measure the detailed geometry of etch pits due to heavy ions with kinetic energies of $1 - 10 \text{ keV/amu}$ at small distance scales registered in the nuclear track detector CR-39 plastic. With a typical range of a few hundred nm and an etch pit depth on the orders of a few tens of nm, these ion tracks cannot be measured using conventional methods. With the technique developed in this work one is able to study the response of CR-39 plastic to particles at low ionization rates by precise measurements of low energy ion tracks. Among other applications, of particular interest is to explore the response of CR-39 in the regime in which nuclear stopping is comparable to electronic stopping.

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