

FORMATION OF HEAVY ION TRACKS IN NUCLEAR EMULSIONS

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The identification of tracks of heavy ions in nuclear emulsions, for example in cosmic ray studies, must rely on a satisfactory track formation theory. Different track width theories have been proposed by Lonchamp (1953), Bizzeti and Della Corte (1959), and Katz and Butts (1965). According to Katz and Butts the energy is transferred from a moving ion to the surrounding medium through the formation of secondary electrons, and the criterion for track formation is that the density of energy deposited in the medium should exceed a threshold value.

This report presents a preliminary test of the track formation theory by Katz and co-workers. The theory has been tested for nuclear emulsions by measuring the tracks of heavy, stopping, cosmic ray particles. Light absorption profiles perpendicular to the tracks have been recorded using a photometer. The experimental data is compared with the theoretical distribution of energy dosage around the path of a passing ion. The dosage has been calculated in accordance with the formulae given by Katz and Kobetich (1969). There is a good correlation between theoretical and measured track widths in the studied charge and velocity intervals.

References

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