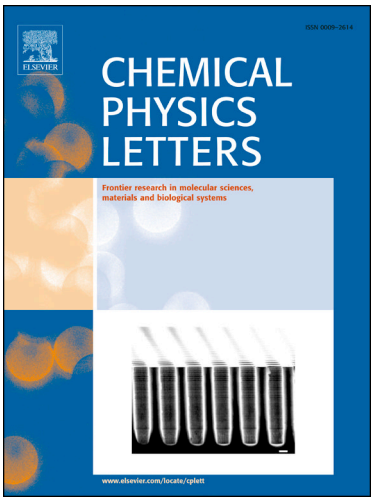

Research paper

An information theoretic model for the linear and nonlinear dissipative structures in irradiated single-walled carbon nanotubes

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An information theoretic model for the linear and nonlinear dissipative structures in irradiated single-walled carbon nanotubes

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Abstract

Experiments with irradiated single-walled carbon nanotubes are shown to generate a set of probability distribution functions and to derive a set of information theoretic entropy-based parameters. Energetic Cs^+ ions initiate linear collision cascades and nonlinear thermal spikes in single-walled carbon nanotubes. The probability distribution functions are constructed from the normalized experimental yields of the sputtered atoms and clusters. The information or Shannon entropy and fractal dimension are evaluated for each of the emitted species. Along with the fractal dimension, the information is used to identify and distinguish the energy dissipation processes that generate conditions for monatomic sputtering and clusters emissions.

KEYWORDS: Radiation effects, single-walled carbon nanotubes, collision cascades, thermal spikes, Shannon entropy, fractal dimension