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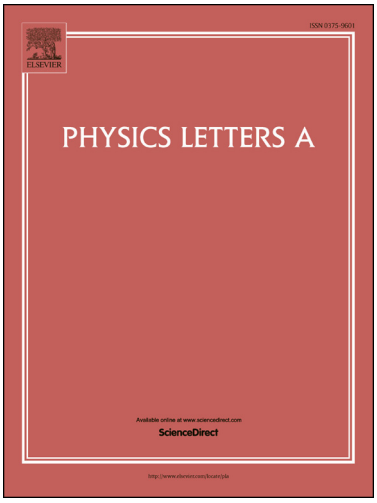

Dynamical and Scale Invariance of Charged Particles Slipping on a Rough Surface with Periodic Excitation

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Highlights

- The stability of fixed points is analyzed with the help of eigenvalue analysis method, and further invariant manifold is constructed to investigate the dynamical invariance such as energy diffusion for $A > 0$ or decay process for $A < 0$.
- Scale invariance analysis is performed to demonstrate the power law of the statistical behavior.
- Both the FA phenomenon and the velocity decay process characterized by then root mean square velocity V_{rms} can satisfy scale invariance.
- Transient number n_x is proposed to evaluate the speed of the velocity decay process, and more importantly is found to posses the attribute of scaling invariance with respect to both the initial velocity V_0 and the parameter A.