1023-74-455 **Anna Vainchtein*** (aav4@pitt.edu), Department of Mathematics, University of Pittsburgh, 301 Thackeray Hall, Pittsburgh, PA 15260, and **Yubao Zhen**. *Dynamics of steps along a martensitic phase boundary.* Preliminary report.

We study the motion of steps along a martensitic phase boundary in a cubic lattice undergoing antiplane shear deformation. We model a phase transforming material by assuming a stress-strain law that is piecewise linear with respect to one component of shear strain and linear with respect to another. Under these assumptions we derive a semi-analytical solution describing a steady sequential motion of the steps under an external loading. Our analysis yields kinetic relations between the driving force, the velocity of the steps and other characteristic parameters of the motion. We show that the kinetic relations are significantly affected by the material anisotropy. Our results indicate the existence of multiple solutions exhibiting sequential step motion. Numerical simulations show that subsonic sequential propagation of sufficiently small number of steps can be stable. In the supersonic regime we observe a cascade nucleation of multiple steps which then join sequentially moving groups. (Received September 13, 2006)