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Change of regime of decay of elastic precursor wave in BCC metals EUGENE ZARETSKY, Ben Gurion University of the Negev, GENNADY KANEL, United Institute for High Temperatures — Our studies of decay of elastic precursor wave with propagation distance in five BCC metals, namely V, Ta, Fe, Nb, and Mo show that at propagation distances of about $h*$ =1 mm the regime of the decay is changed. At propagation distances smaller than $h*$ the decay is fast and the spatial variation of the elastic wave amplitude σ_{HEL} is described by the power function $\sigma_{HEL} = \sigma_0(h/h_0)^{-\alpha}$ with α ranged between 0.3 and 0.7 for different metals at different temperatures. Beyond the distance $h*$ the decay is much slower and is characterized by much lower values of α, of about 0.1 or less. The stresses τ^* at which the transition occurs at room temperature is close to the Peierls stresses τ_P of the studied metals. This allows us to conclude that the change of the decay regime at τ^* is caused by the change of the mode of the dislocations motion from the over-barrier glide controlled by the phonon viscous drag above τ^* to that controlled by thermally activated generation/motion of the dislocation double-kinks below τ^*. The decline of τ^* with temperature ($\sim$ 50% over 1000-K interval) agrees with the growing with temperature support of dislocation motion by thermal fluctuation.

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