Equations of state for the Heusler alloy $Ni_{50.5}Mn_{33.4}In_{15.6}V_{0.5}$

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Currently, many works are devoted to the study of physical effects during phase transitions (PTs) in solid materials. The description of these effects comes down to constructing an adequate model of the equation of state of a solid material near instability caused by a phase transition. In [1], the effect of a sharp dependence of the magnetocaloric effect on the frequency of changes in a strong magnetic field near phase transitions of the first and second kind in ferromagnetic alloys was discovered, however, its physical nature is still not clear. This work is devoted to the study of the equation of state of the Heusler alloy $Ni_{50.5}Mn_{33.4}In_{15.6}V_{0.5}$ with metamagnetostructural phase transitions close in temperature first kind and Curie point (second kind PT, $T_C = 288$ K). The development of a theoretical approach to deriving the equation of state in this alloy during the interaction of two PTs, structural and magnetic, is based on the Landau expansion of free energy in magnetization and spontaneous deformation parameters. In this work, an attempt is made to describe kinetic processes when the PT is exposed to strong non-stationary fields using the Landau–Khalatnikov equations.
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