Electromagnetic waves generation in $Ni_{2,14}Mn_{0,81}GaFe_{0,05}$ Heusler alloy at structural phase transitions

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In recent years both theoreticians and experimentalists have heightened interest in new effects of electromagnetic waves generation under nonequilibrium processes in condensed media. Phase transitions (PT) of 1st and 2nd orders are progressing at significant deviation from equilibrium state, and in this case the medium is active, i.e. it is capable to emit energy as electromagnetic and acoustic waves. So, there is a jump of magnetization ΔM or polarization ΔP of a sample at PT in the magnetic or electrodipole subsystem respectively, which lead to generation of electromagnetic and acoustic fields pulses. Structural phase transitions of 1st order have a more complex nature of the radiation. Structural PT goes during a certain time when nuclei of a new phase, phase boundaries, various defects, dislocations and fractures may form in the sample, what lead to the generation of electromagnetic and acoustic pulses. In this work we investigate both experimentally and theoretically the electromagnetic response and the ability to electromagnetic wave self-radiation at a free surface of the sample Heusler alloy $Ni_{2,14}Mn_{0,81}GaFe_{0,05}$.