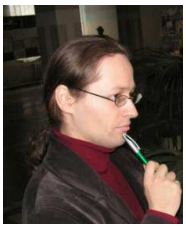

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Research Interests

My primary scientific interests are lying in the area of digital modeling of physical processes. The main direction of research is concerned with propagation of acoustic waves in layered structures. The anomalous non-Frenel transformation of acoustic signal takes place if an energy dissipation of the ultrasound wave is present at least in one of the structure components, and reflected signal becomes sensible to physical parameters of the considered dissipative medium. The list of these parameters includes viscosity (or inner friction) and in some cases geometry characteristics, e.g. those of thin dissipative film on massive substrate.

Dissipative acoustics is an effective basis for non-destructive testing and diagnostics of the wide range of viscose substances that features relatively high sound speed dispersion. But it requires digital spectral analysis to be used for its proper interpretation.

The same properties are demonstrated by materials under chemical, aggregate and phase changes, local heating, etc. Some of my scientific works are also devoted to magnetoacoustics of Heysler alloy with shape memory in its phase transitions and are targeted at clearing the ability and special conditions of shape memory control both by magnetic field and by ultrasound which can be used in a range of urgent hi-tech areas from nanorobotics to aerospace technologies.

Sample Publications

Kostiuk D.A., Kuzavko Yu.A. Anomalies of the Boundary Reflection of Ultrasound from the Film of a Dissipative Mmedium // Journal of Engineering Physics and Thermophysics, 2004, VOL 77; No 5, pp. 1040-1048

Karpuk M.M., Kostiuk D.A., Kuzavko Yu.A., Shavrov V.G. Reflection of Elastic Waves in a Crystal of Heusler Alloy Ni_2MnGa in the Phase Transition Range. // Technical Physics, 2009, Vol. 54, No. 1, pp. 82–88.