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Mechanical (acoustic-like) wave propagation along a vortex array in the superconducting heterostructure

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Magnetic flux can penetrate the type - II superconductor in the form of Abrikosov vortices (also called flux lines, flux tubes or fluxons) each carrying a quantum of magnetic flux. These tiny vortices of supercurrent tend to arrange themselves in a triangular or quadratic flux-line lattice. Since the vortices are formed by the applied magnetic field, around of each of them the supercurrent flows. Moreover, there also exist some Lorentz force interactions among them. Those interactions form an origin of an additional mechanical (stress) field occurring in the type-II superconductor. The paper deals with an analysis of elastic (acoustic-like) wave propagation solely along vortices in a heterostructure consisted of the superconducting layer put on the superconducting substrate. Dispersion and the amplitude distribution of those waves in the vortex field existing in that structure has been presented.