Abstracts

Piezoelectric Rayleigh Wave Excitation by Bulk Wave Scattering

H.L. Bertoni. "Piezoelectric Rayleigh Wave Excitation by Bulk Wave Scattering." 1969 Transactions on Microwave Theory and Techniques 17.11 (Nov. 1969 [T-MTT] (Special Issue on Microwave Acoustics)): 873-882.

The excitation of a Rayleigh surface wave on a piezoelectric crystal by the scattering of bulk waves from strips deposited on the crystal's surface is considered. Using small scatterer approximations to obtain a lower limit for the strength of excitation that can be obtained by the scattering method, the Rayleigh wave excitation resulting from the mass of the deposited strips is determined. Numerical calculations for CdS, LiNbo/sub 3/, and isotropic solids indicate that this method of excitation is feasible. Simple, small scatterer estimates for the order of magnitude of the excitation resulting from the conductivity of strips deposited on CdS and LiNbO /sub 3/suggest that the Rayleigh wave can be more strongly excited through the mass of the strips than through their conductivity. In order to evaluate the Rayleigh wave excitation, an expression has been derived that describes the excitation of elastic surface waves, guided by configurations composed of infinite, parallel layers of arbitrary piezoelectric and elastic materials, when the source of these waves are prescribed, two-dimensional force and current distributions. This expression for the surface wave excitation coefficient depends only on the source and the properties of the surface wave, and is expected to prove useful in rating a wide variety of exciting structures. For the scattering method of excitation considered here, the effect of the incident bulk wave on the strips can be represented by approximately equivalent sources, which excite the surface wave.

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