Multiscale phenomena in molecular matter



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## Total transmission of elastic waves in solid-solid interface

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When encountering a mismatch of characteristic impedance a bulk acoustic wave transforms into up to three reflected and refracted waves of different polarizations. The effect is known as mode conversion. The lack of the specularly reflected wave is called total mode conversion because then all the outgoing waves propagate at speeds different than that of the incident one, what it's know at the half-space of elastic media [1, 2]. Conversely, if the only outgoing wave reflects in the specular way one speaks of no-conversion. Existence of those both phenomenons for a particular angle of incident wave give a rise to lack of reflected wave and it is called total transmission. Discovery of materials with negative Poisson's ratio [3] enlarged the range of possible impedance mismatch and of the related phenomena. The conditions for the total mode conversion and no-conversion in reflection and for total transmission as well as related angles of incidents waves will be presented in relation to region of existence of Stoneley waves for whole range of Poisson's ratio.

## References

[1] J. Miklowitz, *The Theory of Elastic Waves and Waveguides* (North-Holland Series in Applied Mathematics and Mechanics) (North Holland, 2012) Chap. 3.

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[3] R. Lakes, Science 235, 1038 (1987).

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