## KSCM2022305 Generalized matching layers for perfect elastic-wave transmission

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## **Extended Abstract**

Consider a situation in which elastic waves are transmitted from an incident medium to a different target medium. When a longitudinal wave is obliquely incident at the solid-solid interface, both longitudinal and transverse waves are "partially" transmitted (see Fig. 1(a)). Of course, unwanted reflections always occur as well. In this presentation, we introduce a new concept of a generalized matching layer that can "perfectly" transmit the target-mode (either longitudinal or transverse) elastic wave with 100% energy efficiency. By inserting the L-to-L or L-to-T matching layer between two dissimilar solids, mode-preserving (longitudinal-to-longitudinal) or mode-converting (longitudinal-to-transverse) perfect transmission can be successfully realized at the target incidence angle (see Figs. 1(b) and 1(c), respectively) [1].



Fig. 1. The transmittance of longitudinal (red) and transverse (blue) waves as a function of the incidence angle of the incident longitudinal wave without and with the generalized matching layer. The incident medium and the target medium are aluminum and PEEK, respectively. The target frequency and the incidence angle to realize perfect transmission is 100 kHz and 60°, respectively.

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## Reference

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