Supplementary Information

Slowness curve surface acoustic wave transducers for optimized acoustic streaming

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1. Mesh convergence study

A mesh convergence study was conducted as reported in [1], where the surface-normal displacement amplitude was evaluated as a function of the number of mesh elements per wavelength. The convergence parameter, *G*, was defined as:

$$G = \sqrt{\frac{\int \left(g - g_{ref}\right)^2 dxdy}{\int \left(g_{ref}\right)^2 dxdy}}$$

where *g* was the surface-normal displacement amplitude, δ_z. The mesh was determined to be converged at a mesh ratio of 6 elements per wavelength, with an error of 1.96%. For simulations of circular arc and slowness-curve-adjusted IDTs with $\theta = 60^o$ a coarser mesh was used, owing to computational cost, with 5 mesh elements per wavelength with an error of 5.39%.

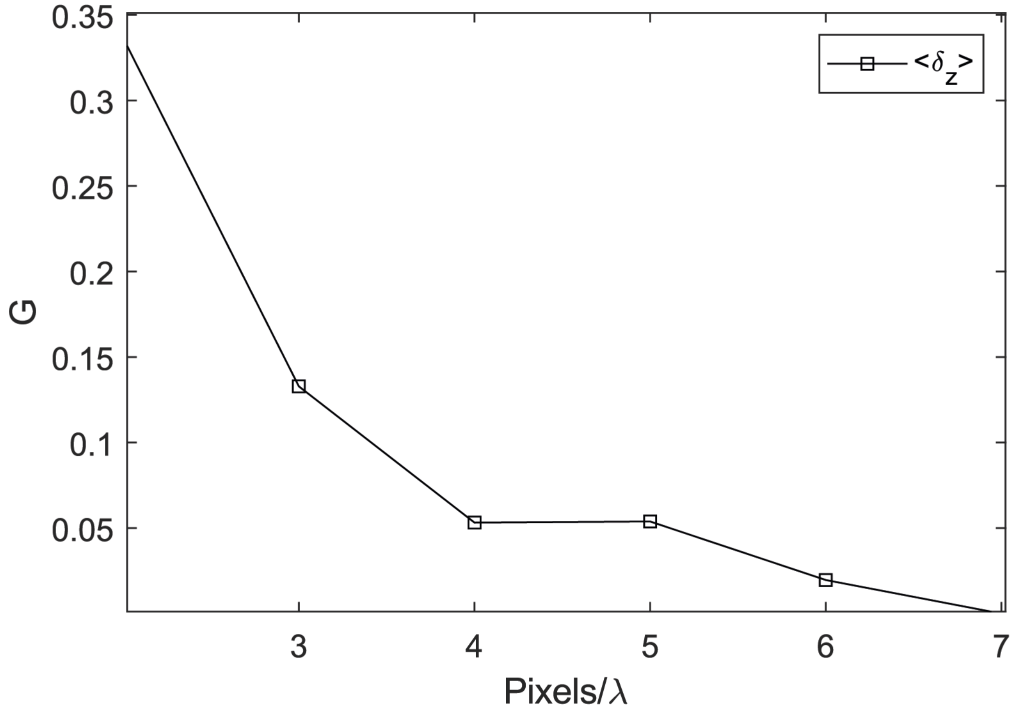

Figure S1. Plot of convergence parameter, G, as a function of the number of mesh elements per wavelength. Convergence was evaluated using the surface-normal displacement.

2. Simulated slowness curve

The slowness $(v(\phi)^{-1})$ curve for 128Y-cut lithium niobate was calculated from simulated Eigenfrequencies, and is plotted in Figure S2. The beam steering angle, Γ, is illustrated.

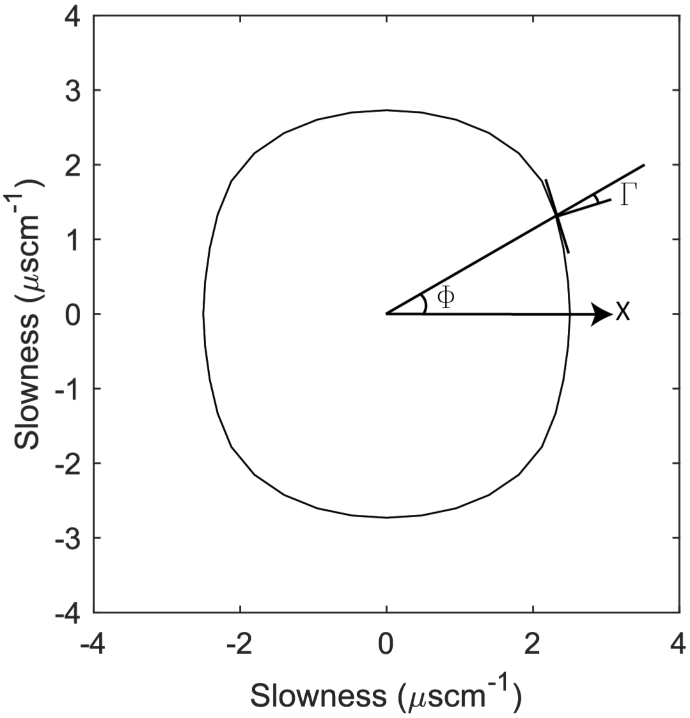

Figure S2. Simulated slowness-curve for 128°-YX lithium niobate with beam steering angle, Γ, indicated for a given propagation direction, ϕ.

3. Fitting parameters for Taylor series expansion of simulated phase velocity

Table S1. Fitting parameters for Eqn. 3 quoted to three significant figures.

Parameter	**Value**
a0	3710
a1	174
a2	126
a3	-4.66
a4	-14.7
b1	0.116
b2	0.169
b3	-0.009
b4	-0.039
ω	0.035