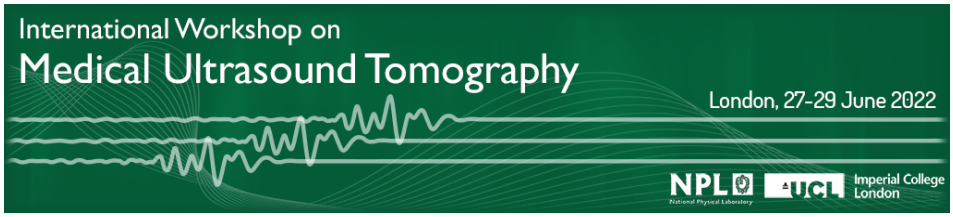

Contribution ID: **23** Type: **not specified**

Crosstalk-free source encoding

Tuesday, June 28, 2022 11:00 AM (20 minutes)

In the context of wavespeed and attenuation maps reconstruction using Full Waveform Inversion with explicit time domain solvers, we developed a cross-talk free source encoding method. This enables image computations within minutes while data from hundreds of different sources are assimilated. Instead of involving a wave simulation number proportional to the number of sources at each iteration, the proposed method only requires two "super" wave simulations per iteration. Our source encoding method consists of capturing simultaneously the monochromatic behavior of different sources at specific frequencies. This is achieved by running a "super" wave simulation until it reaches steady state. Individual contributions of each source to the "super" steady wavefield can then be deblended by taking advantage of trigonometric orthogonality. Rather than capturing the behavior of the full spectrum of a given source, only a few frequencies per source are considered. Thanks to frequency redundancy, this decimation does not dramatically affect sensitivity kernel quality. On the other hand, assimilation of data coming from numerous different sources dramatically improves the resulting kernel, which translates into significantly faster convergence. Another benefit is the statistical reduction of the impact on convergence of data noise. We show how to build measurements based on the Fourier coefficients of the full data time series, such as waveform, phase and amplitude. We evaluate the relative convergence of each associated cost function, in their standard or in their double difference formulation. 2D and 3D results of wavespeed and attenuation reconstructions are presented.

Preferred Contribution Type

Presentation

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