Interferometric Imaging with Intensity-Only Measurements

Date:

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Time:

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Location:

SSB 120

For More
Information
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Abstract:

This talk concerns the problem of active array imaging of weak localized scatterers in randomly inhomogeneous media when only intensities are measured. To image we propose a methodology based on cross-correlations, which can be obtained from multiple-frequency intensity only measurements. The cross-correlations are the elements of the time reversal matrix for one receiver and multiple sources emitting at multiple stepped frequencies. We show how the time-reversal matrix can be obtained from intensity only measurements using an appropriate illumination strategy and the polarization identity. Imaging is based on back-propagating the elements of the time reversal matrix that correspond to cross-correlations at nearby frequencies and for nearby sources. A simple linear algebra implementation of the thresholding operation is implemented using a mask, that is a matrix with only zero and one elements. The robustness of our approach is illustrated with several numerical simulations carried out in an optical imaging regime.

Bio:

Prof. Chrysoula Tsogka is a Professor at the Department of Mathematics and Applied Mathematics of the University of Crete (on leave) and currently a Visiting Professor at the Department of Mathematics at Stanford University. She holds a PhD with distinction in Applied Mathematics from the University Paris IX, France. In parallel to her research on forward wave propagation problems, she has also been working on inverse problems and more precisely on time reversal and wave imaging in random media. She has participated in several research grants in the US and in Europe. In particular, she was awarded a European Research Council (ERC) starting grant for her research project on the Algorithmic Development and Analysis of Pioneer Techniques for Imaging with waVES. In the past she has been a Postdoctoral Fellow at Stanford University, USA, a Tenured Researcher at Centre National de la Recherche Scientifique, France and an Assistant Professor at the University of Chicago, USA.