

**A cluster of many small holes with negative imaginary surface impedances may generate a negative refraction index**  
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**Direct scattering by a sound hard small body**

**Challa, Durga Prasad** Imaging, Multi-Scale and High Contrast Partial Differential Equations : Seoul ICM 2014 Satellite Conference Imaging, Multi-scale and High Contrast PDEs, August 7-9, 2014, Daejeon, Korea 2016 / p. 131-138 <http://dx.doi.org/10.1090/conm/660>

**Extraction of the index of refraction by embedding multiple small inclusions**

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**Location and size estimation of small rigid bodies using elastic far-fields**

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**Multiscale analysis of the acoustic scattering by many scatterers of impedance type**

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