

Abstract Submitted
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Exact analysis of a Veselago lens in the quasi-static regime¹ ASAF FARHI, DAVID J. BERGMAN, Tel Aviv University — The resolution of conventional optical lenses is limited by the wavelength. Materials with negative refractive index have been shown to enable the generation of an enhanced resolution image where both propagating and non-propagating waves are employed. We analyze such a Veselago lens by exploiting some exact one dimensional integral expressions for the quasi-static electric potential of a point charge in that system. Those were recently obtained by expanding that potential in the quasi-static eigenfunctions of a three-flat-slabs composite structure. Numerical evaluations of those integrals, using realistic values for physical parameters like the electric permittivities of the constituent slabs and their thicknesses, reveal some surprising effects: E.g., the maximum concentration of electric field occurs not at the geometric optics foci but at the interfaces between the negative permittivity slab and the positive permittivity slabs. The analysis provides simple computational guides for designing such structures in order to achieve enhanced resolution of an optical image.

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Asaf Farhi
Tel Aviv University

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