

Light Propagation in Periodic Structures: Bragg Stacks and Photonic Crystals

Jakob Rosenkrantz de Lasson

Nanophotonics Theory & Signal Processing

www.nanophotonics.dk

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 DTU Fotonik
Department of Photonics Engineering



1D Periodic Structure: Finite Bragg Stack



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Air

n_0

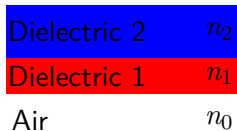


1D Periodic Structure: Finite Bragg Stack

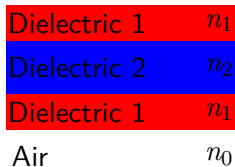
Dielectric 1	n_1
Air	n_0



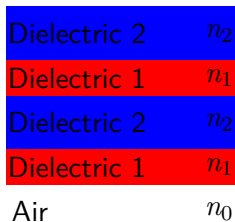
1D Periodic Structure: Finite Bragg Stack



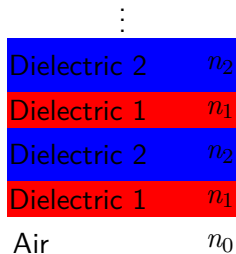
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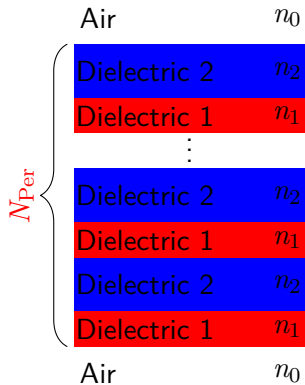
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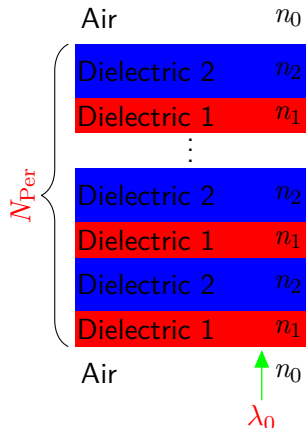
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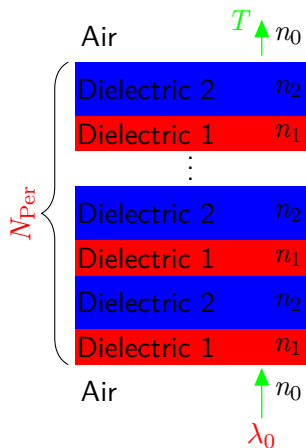
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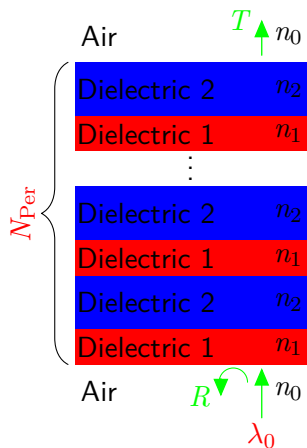
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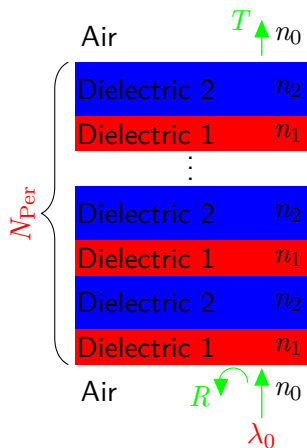
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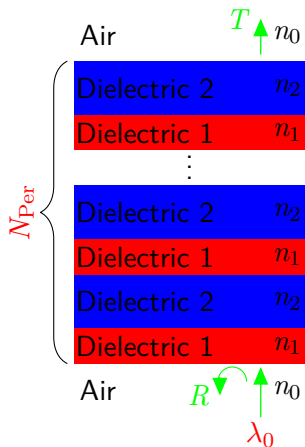
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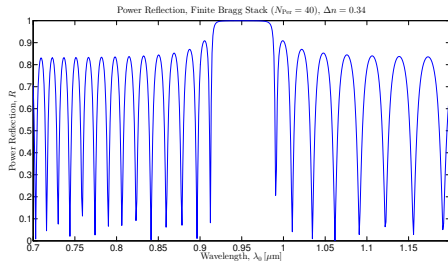
$$\Delta n = |n_2 - n_1|$$



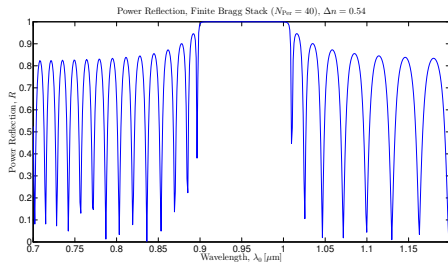
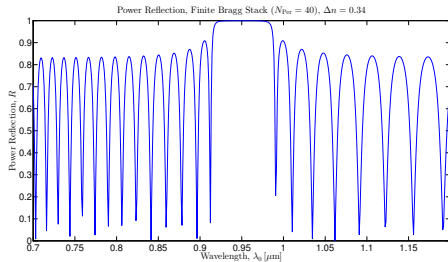
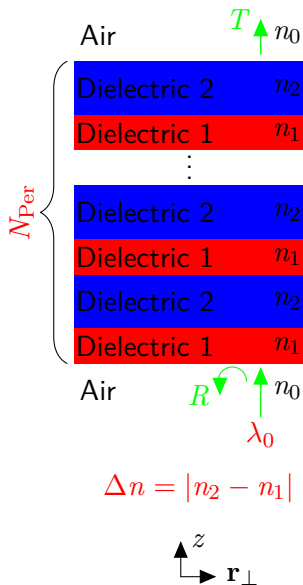
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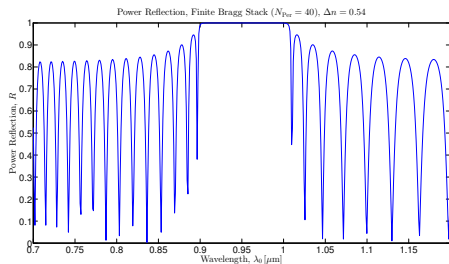
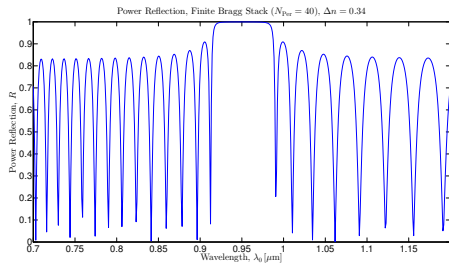
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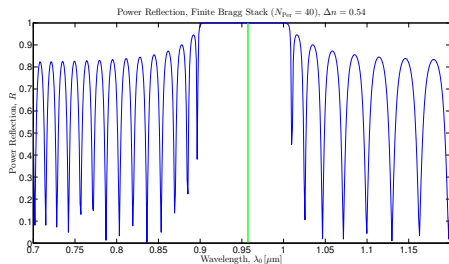
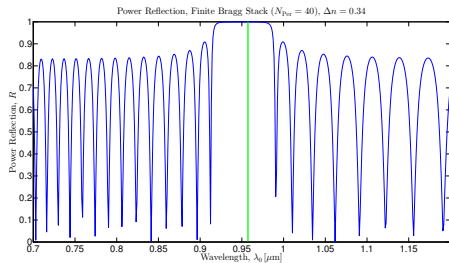
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Finite Bragg Stack: Field Plots

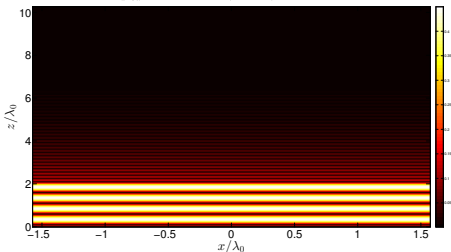


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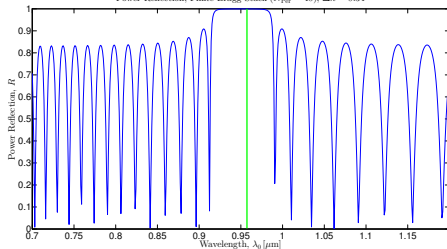


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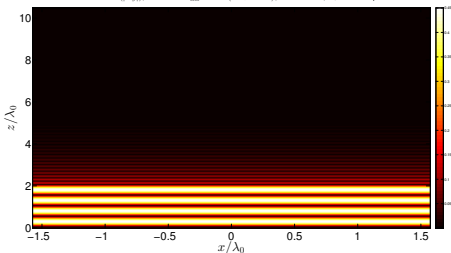
Field Plot ($|E_y|$), Finite Bragg Stack ($N_{\text{per}} = 40$), $\Delta n = 0.34$, $\lambda_0 = 0.955 \mu\text{m}$



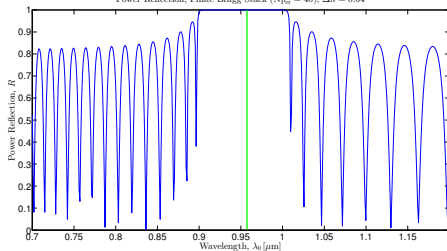
Power Reflection, Finite Bragg Stack ($N_{\text{per}} = 40$), $\Delta n = 0.34$



Field Plot ($|E_y|$), Finite Bragg Stack ($N_{\text{per}} = 40$), $\Delta n = 0.54$, $\lambda_0 = 0.955 \mu\text{m}$

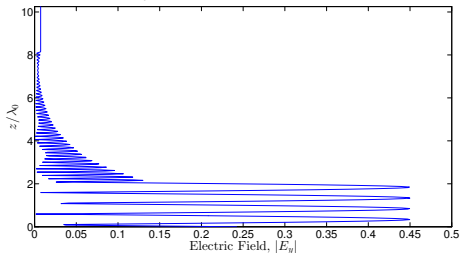


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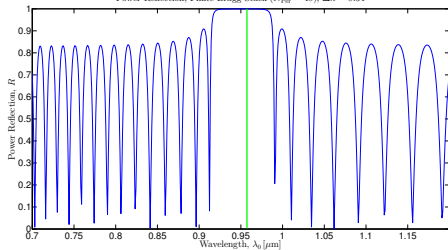


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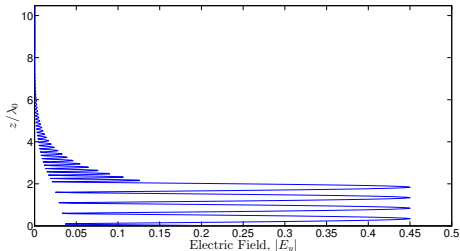
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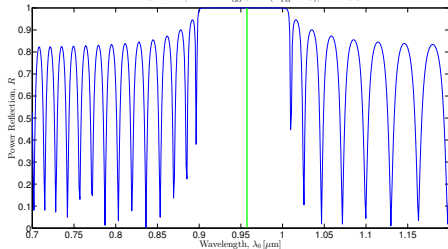
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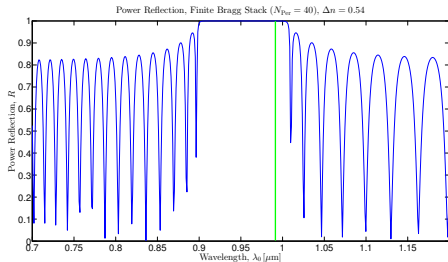
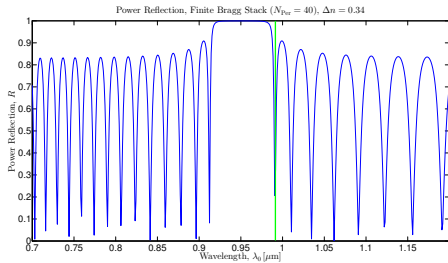
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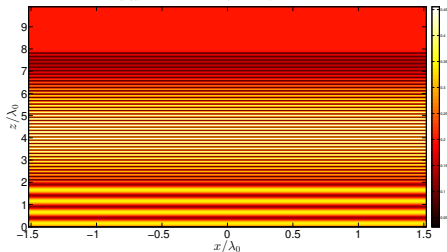


Finite Bragg Stack: Field Plots

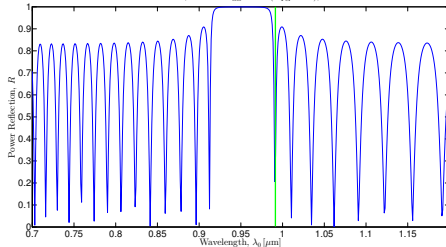


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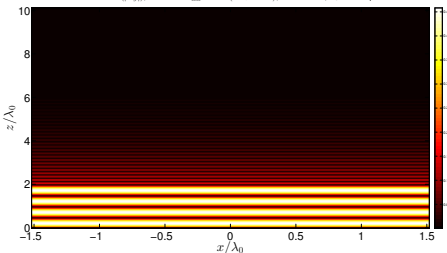
Field Plot ($|E_y|$), Finite Bragg Stack ($N_{\text{Per}} = 40$), $\Delta n = 0.34$, $\lambda_0 = 0.99 \mu\text{m}$



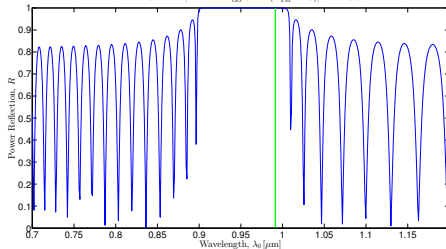
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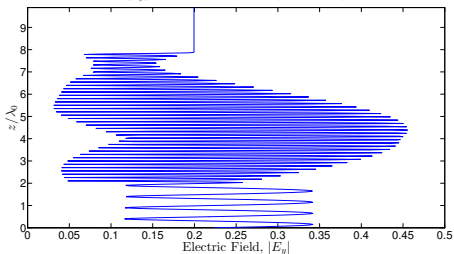


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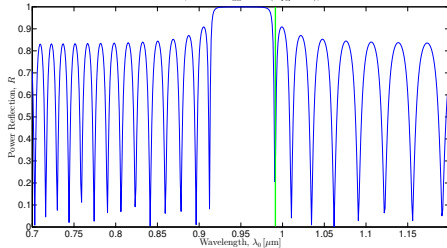


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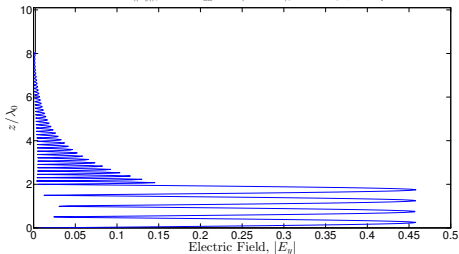
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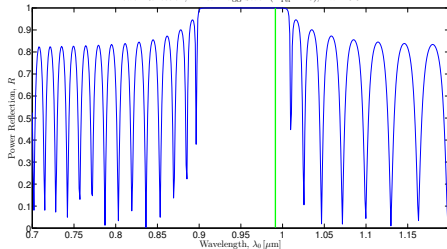
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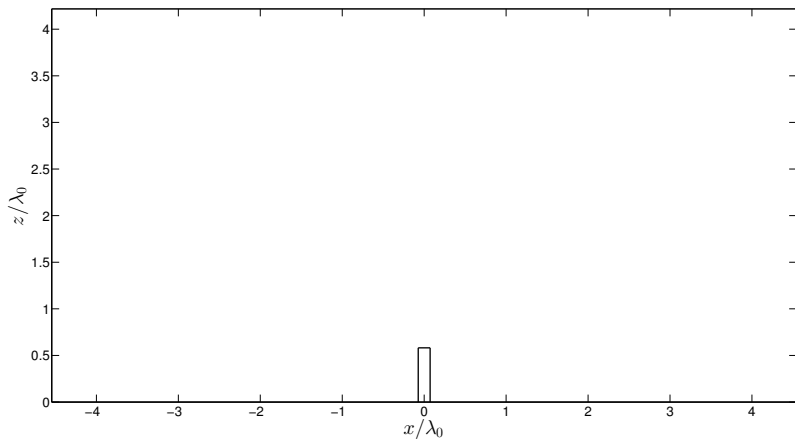
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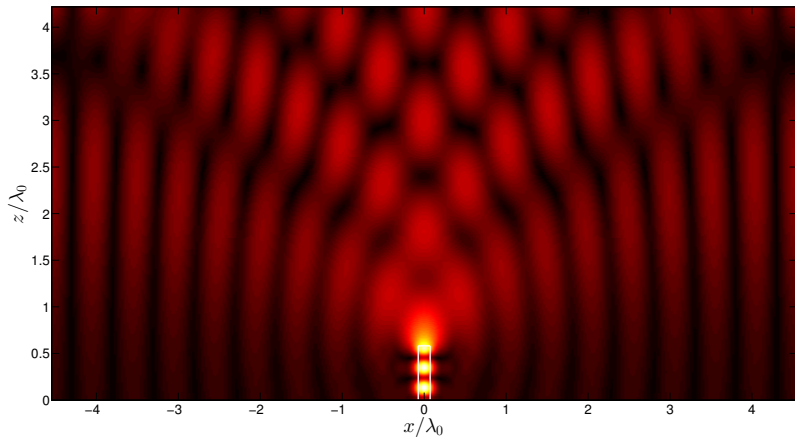
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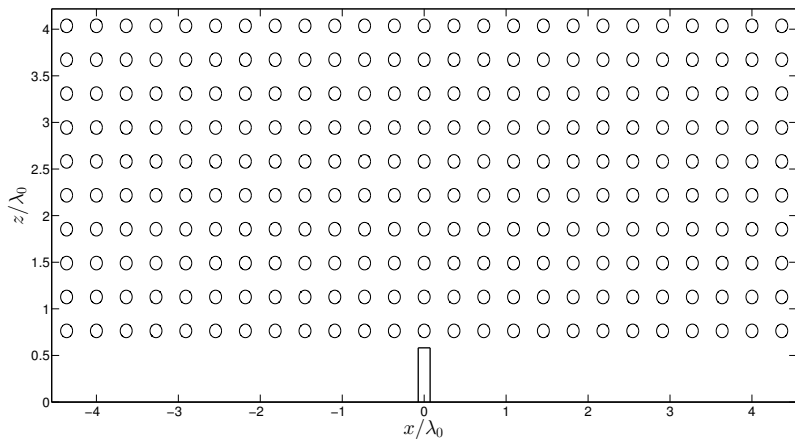
2D Structure: Waveguide and Free Space



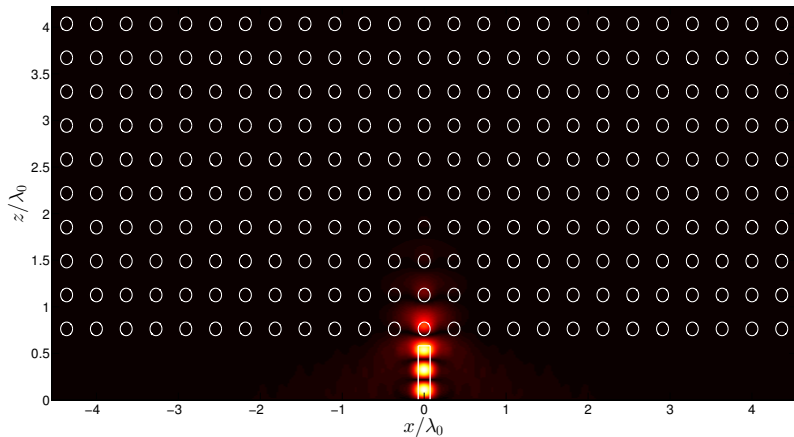
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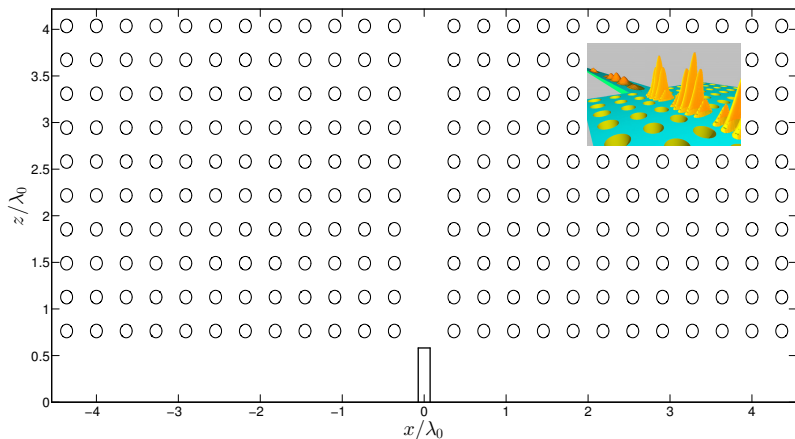
2D Periodic Structure: Waveguide and Photonic Crystal I



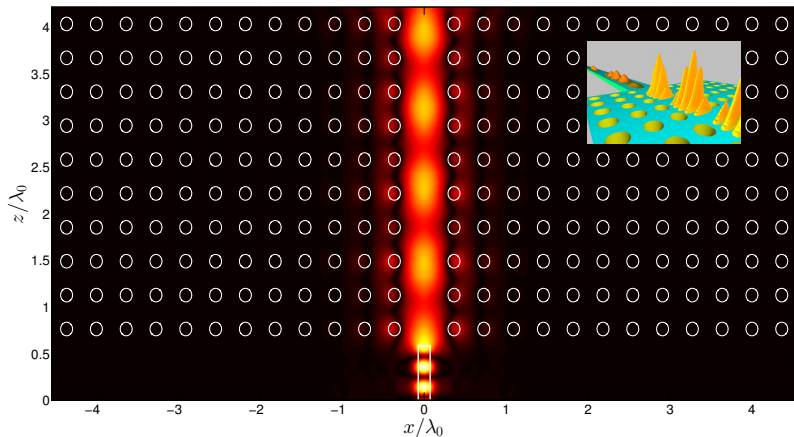
2D Periodic Structure: Waveguide and Photonic Crystal I



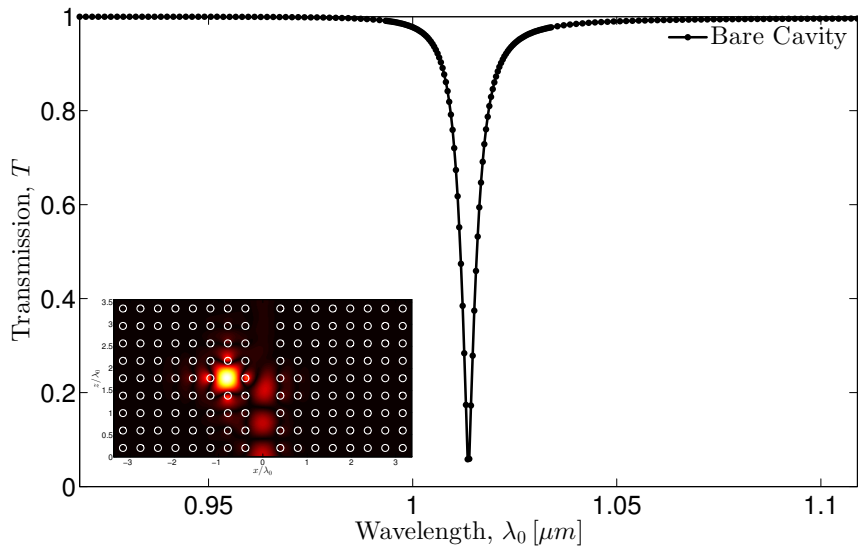
2D Periodic Structure: Waveguide and Photonic Crystal II



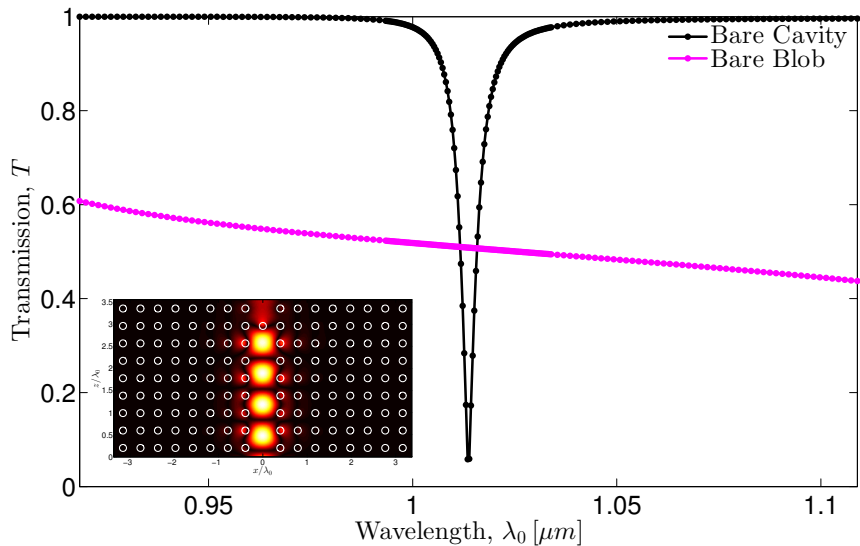
2D Periodic Structure: Waveguide and Photonic Crystal II



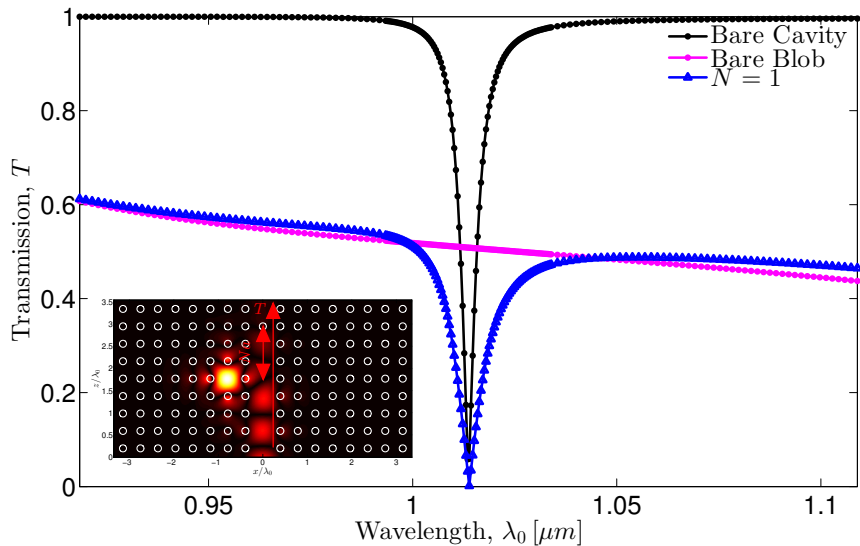
Fano Spectrum Photonic Crystal Structure



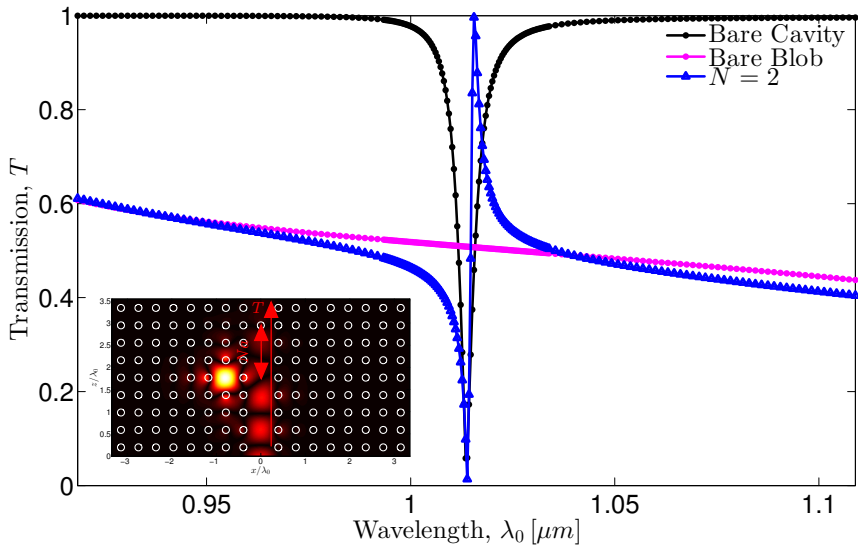
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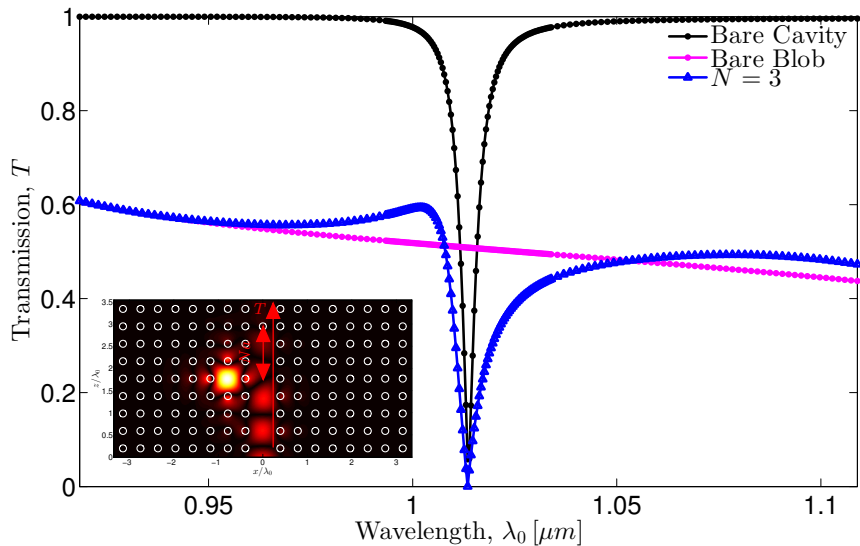
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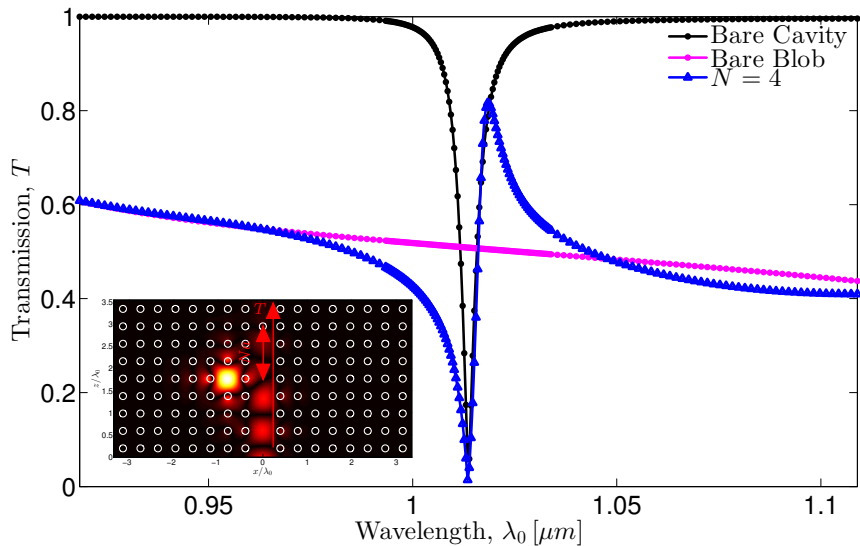
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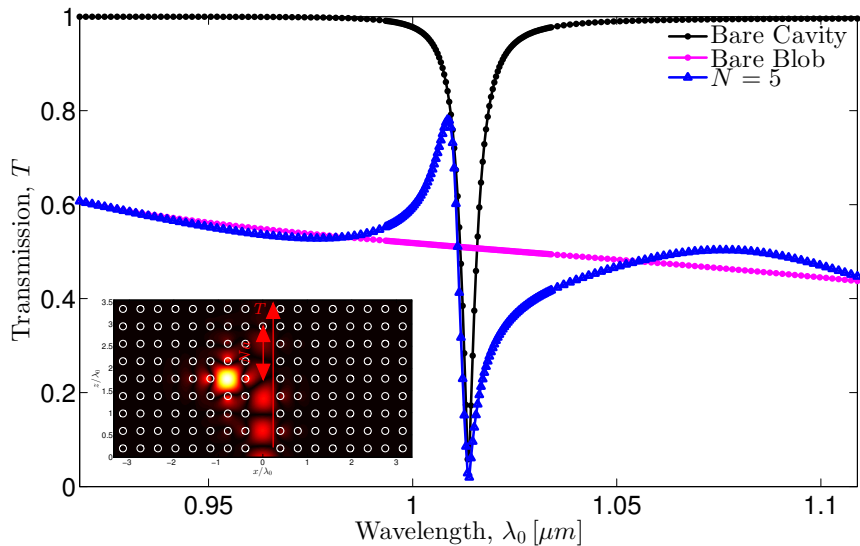
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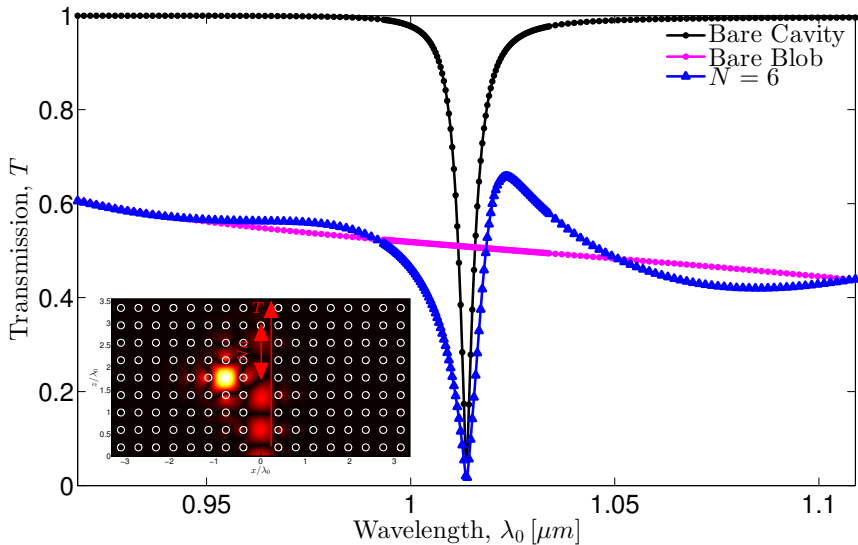
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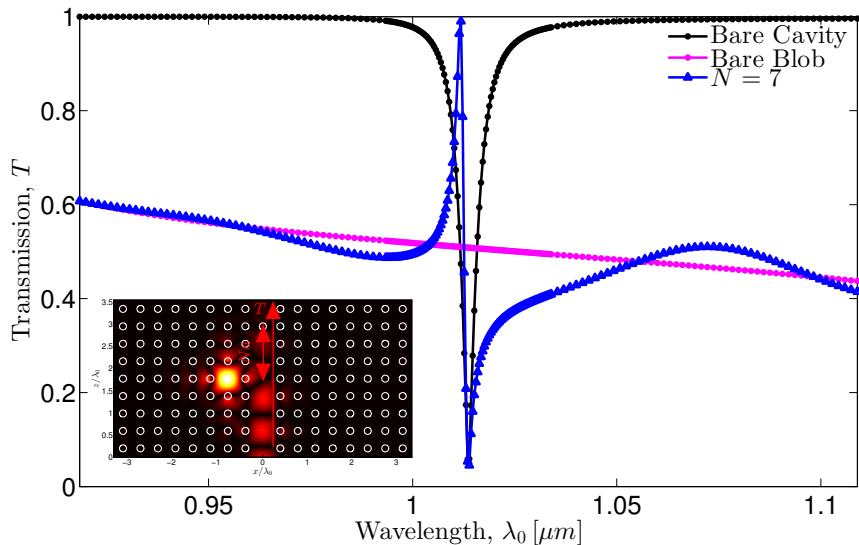
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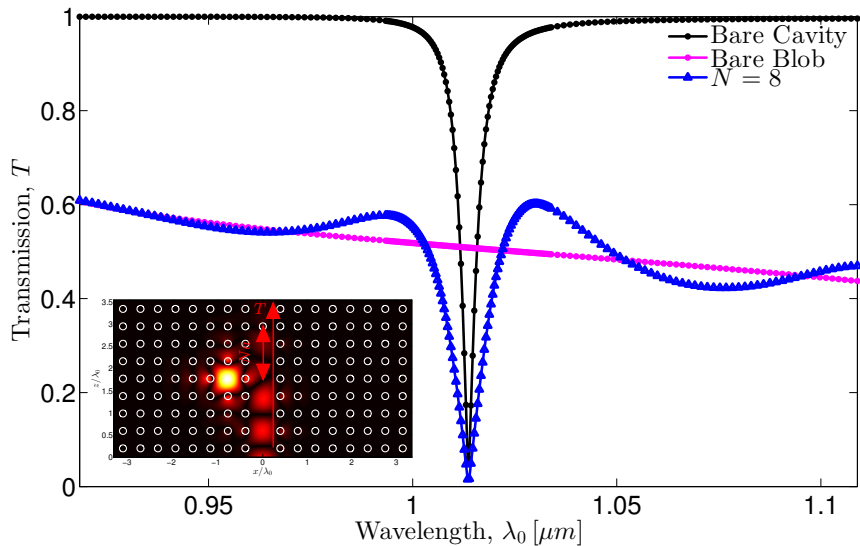
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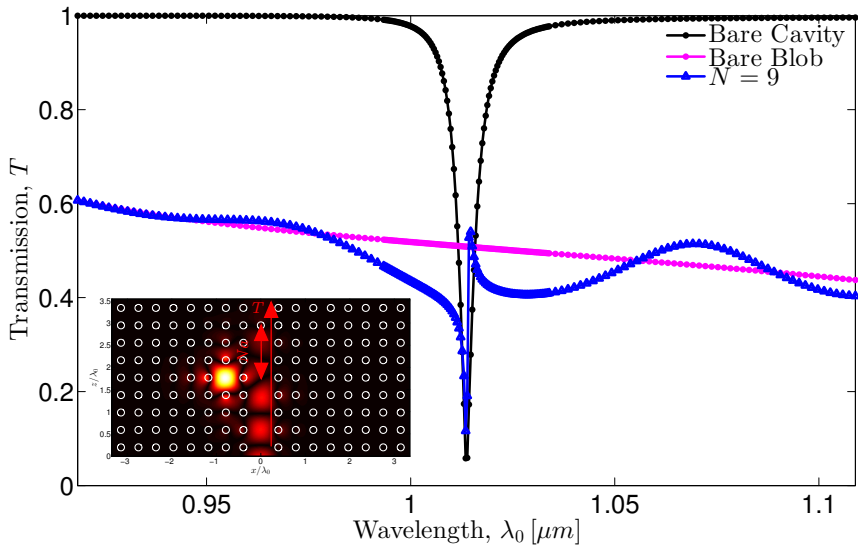
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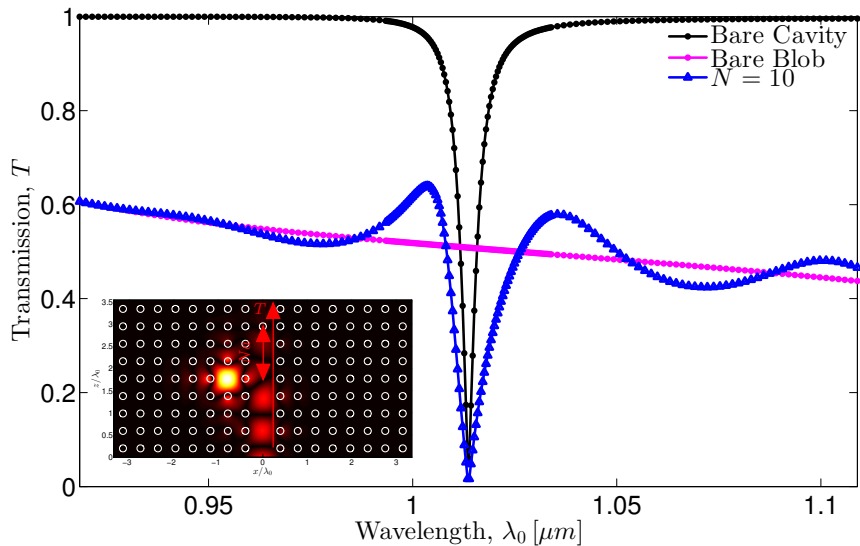
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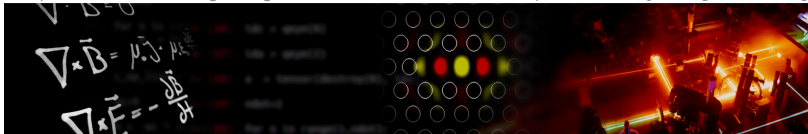


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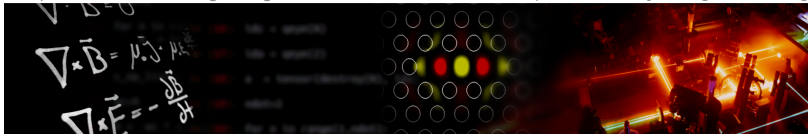
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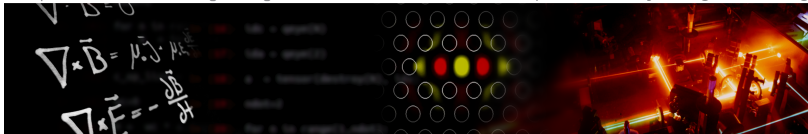


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