

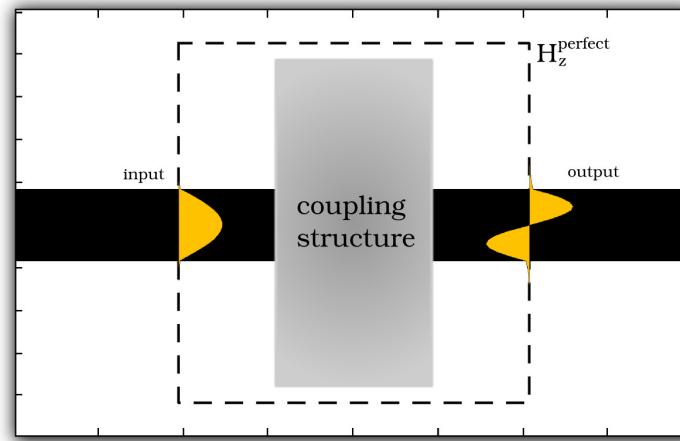
Jesse Lu, group presentation, 2012-06-07

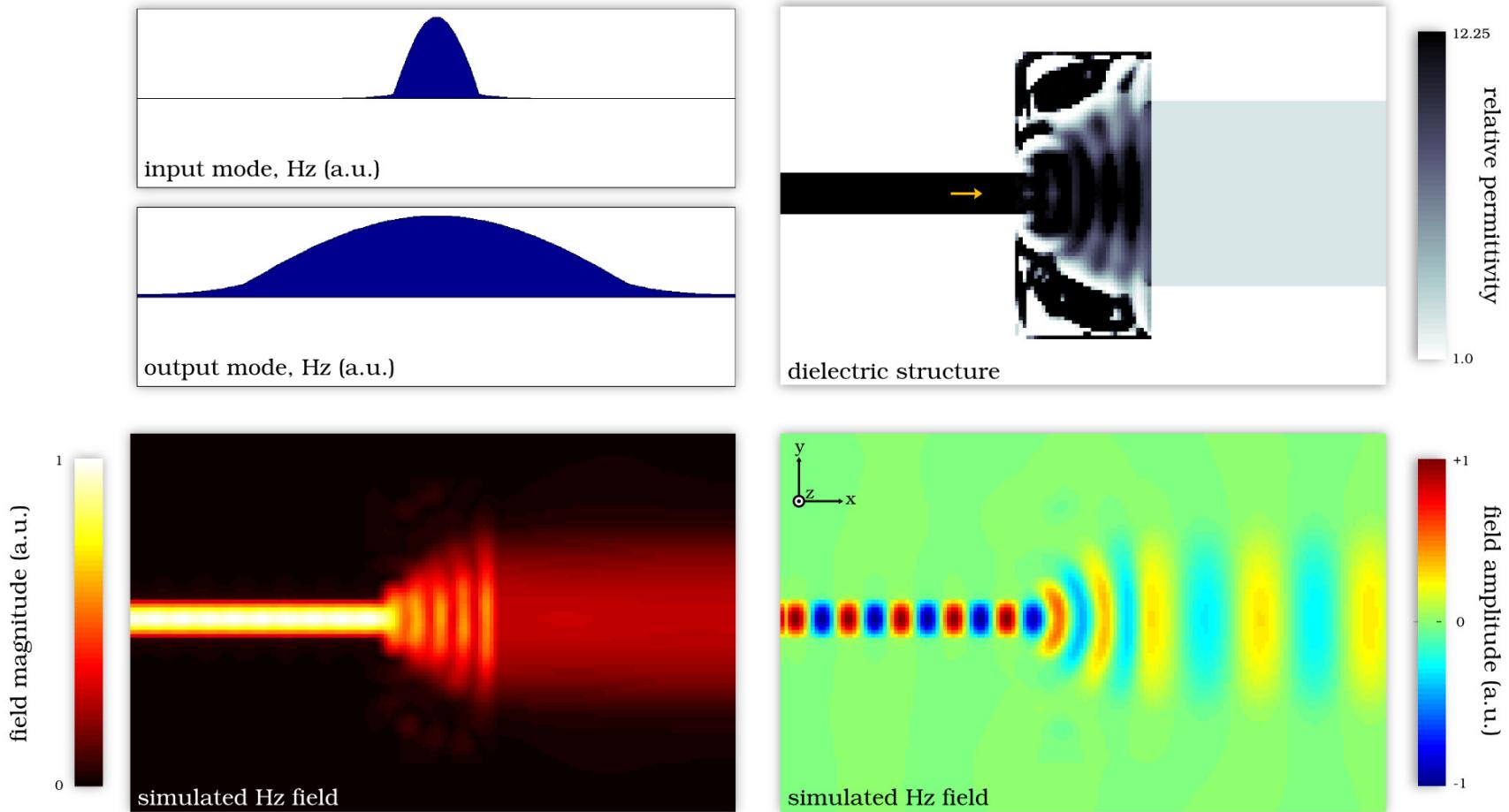
Ob-1 says...

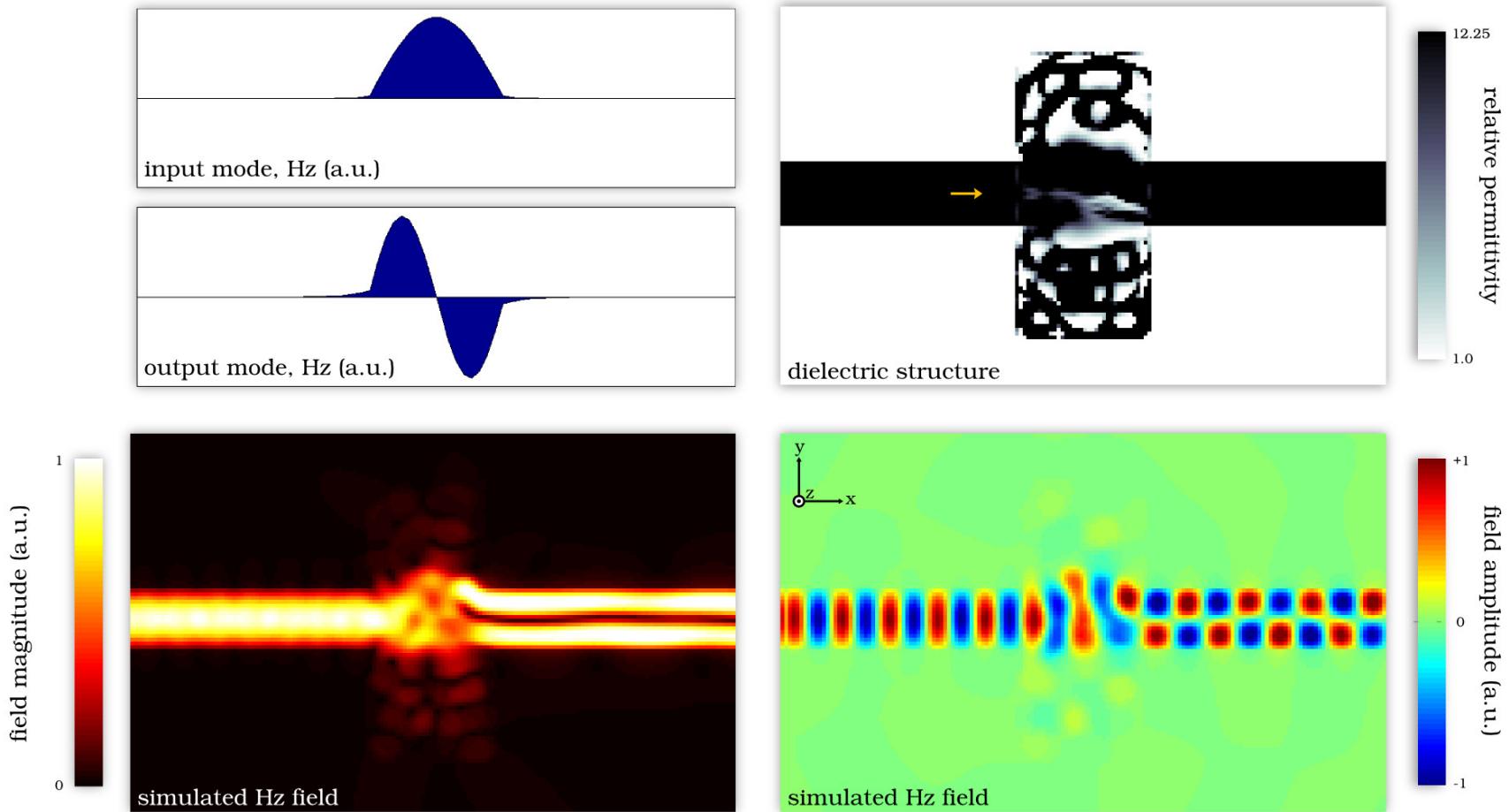
$$\begin{aligned} & \underset{x,p}{\text{minimize}} && \|A(p)x - b(p)\|^2 \\ & \text{subject to} && f(x) = f_{\text{ideal}} \\ & && p_0 \leq p \leq p_1. \end{aligned}$$

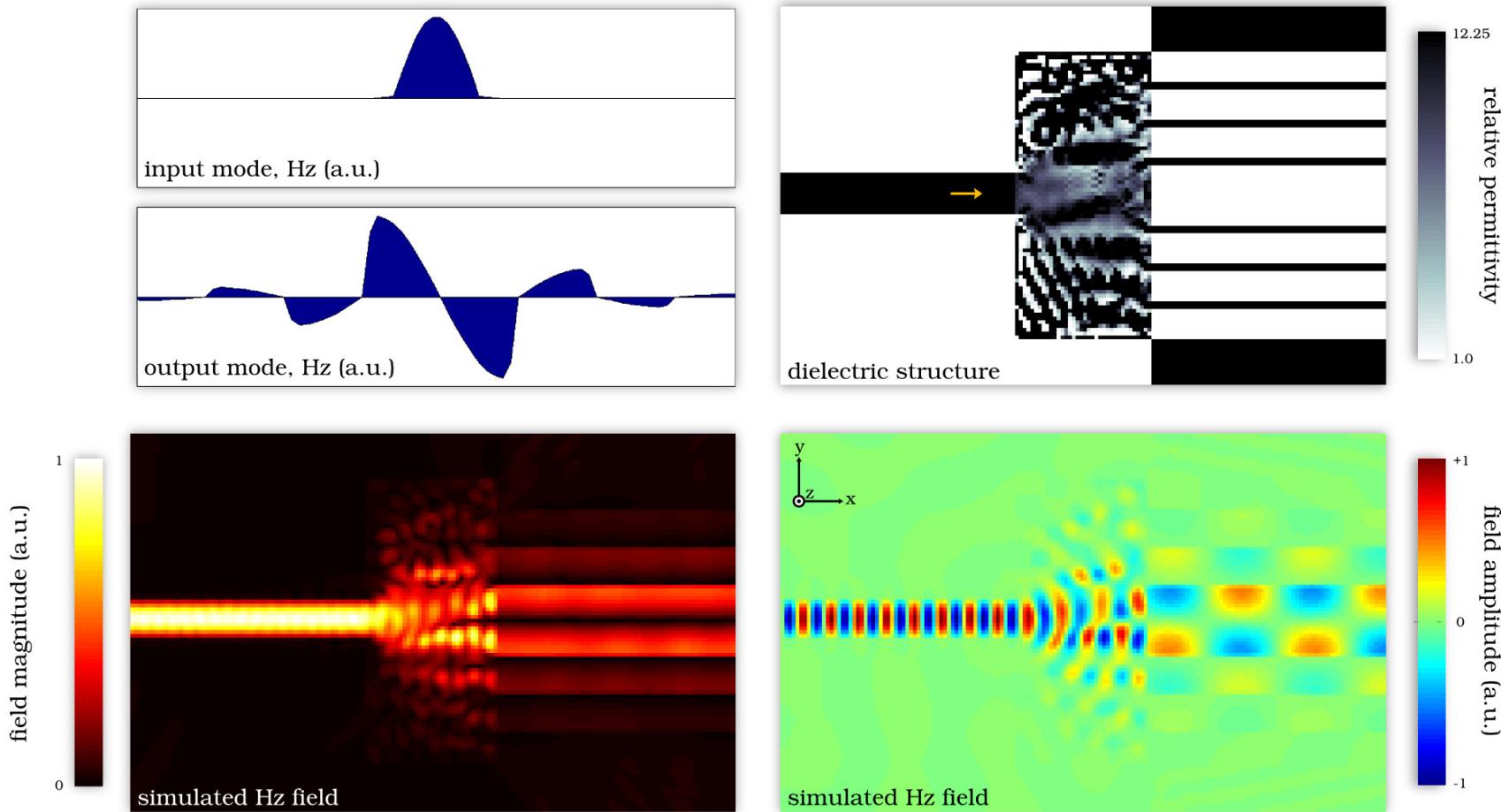
- $x \rightarrow H$
- $p \rightarrow \epsilon^{-1}$
- $A(p)x - b(p) \rightarrow \nabla \times \epsilon^{-1} \nabla \times H - \mu \omega^2 H$
- In general, $A(p)x - b(p) \neq 0$, the *physics residual*

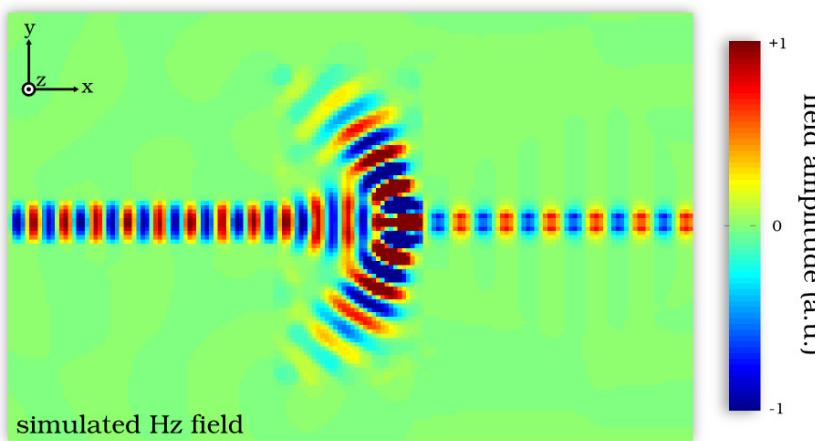
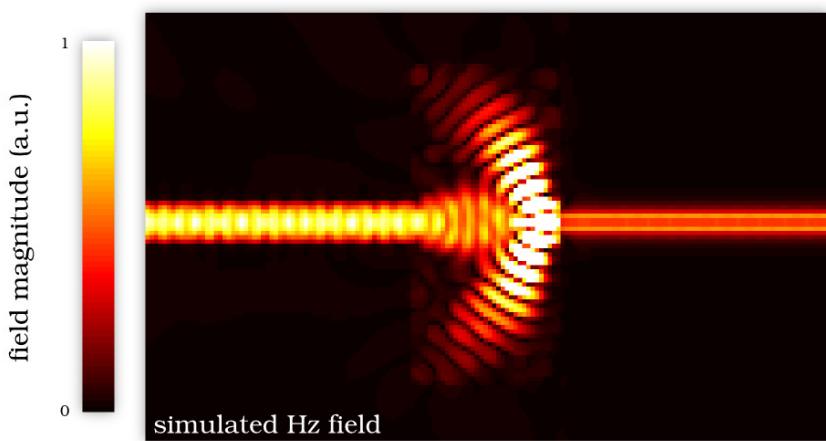
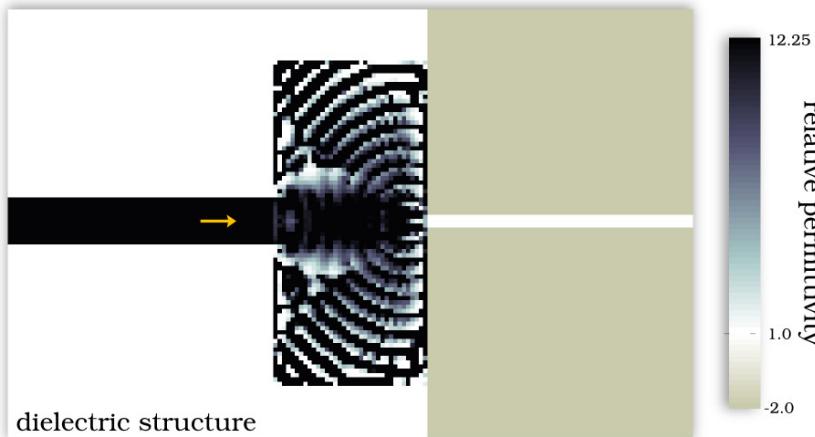
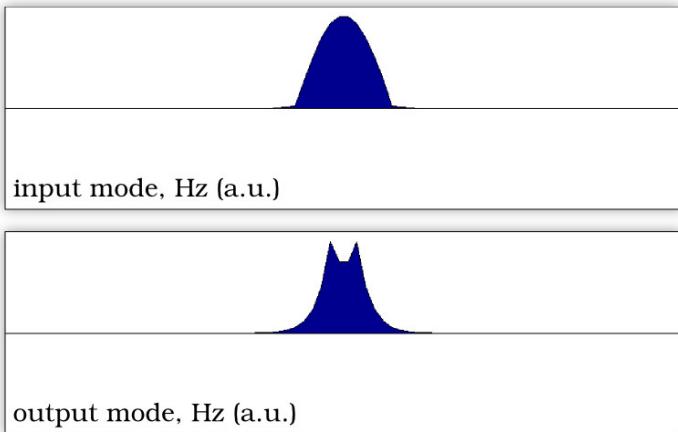
- $f(x)$ is the *design objective*, always met.

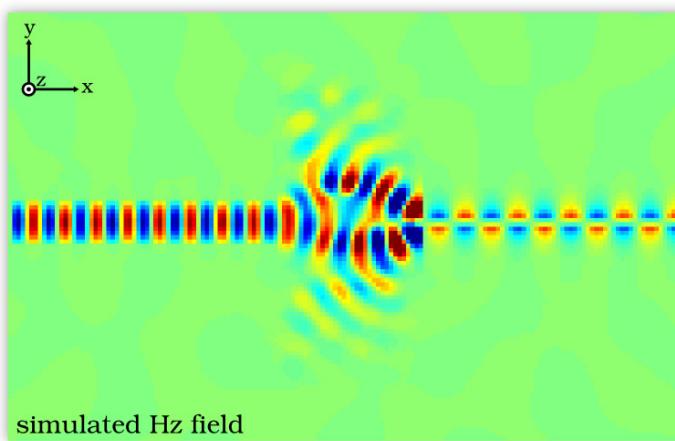
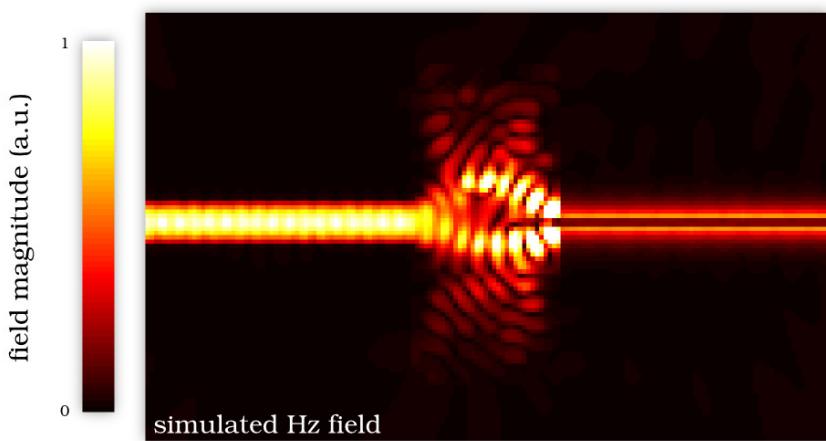
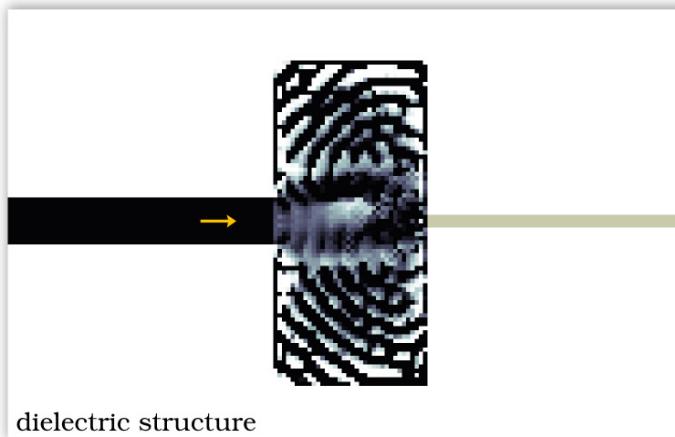
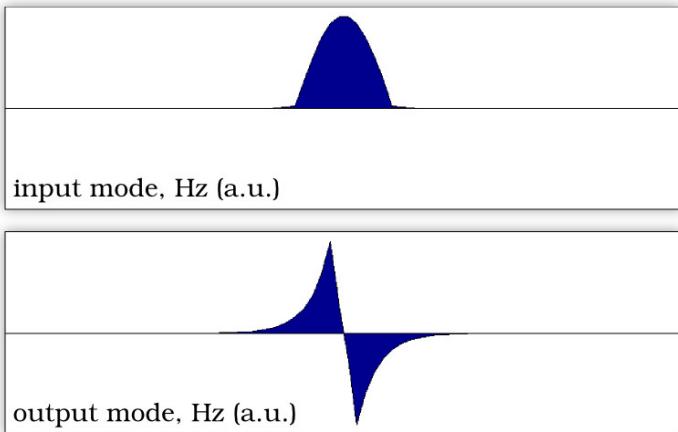






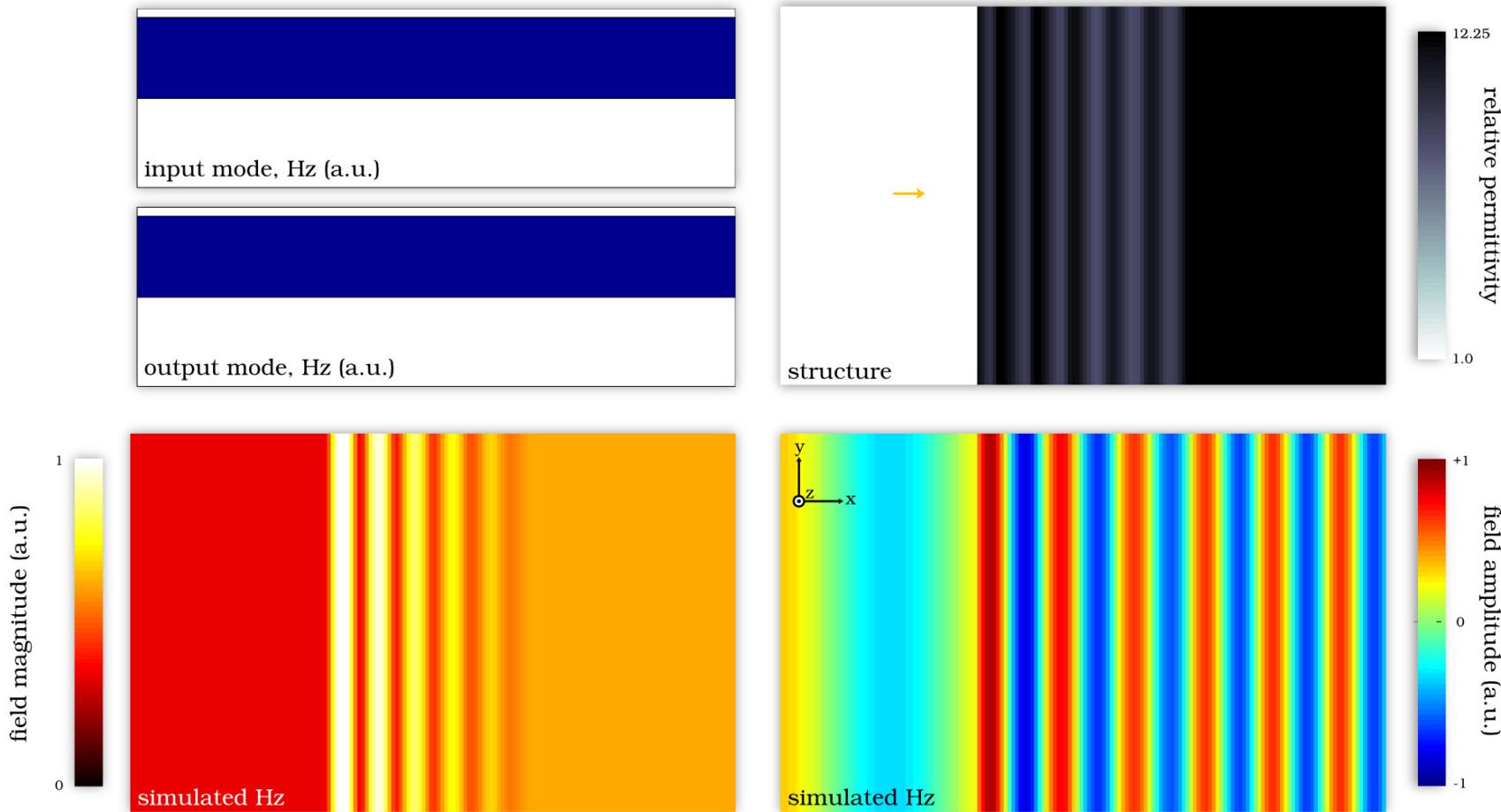


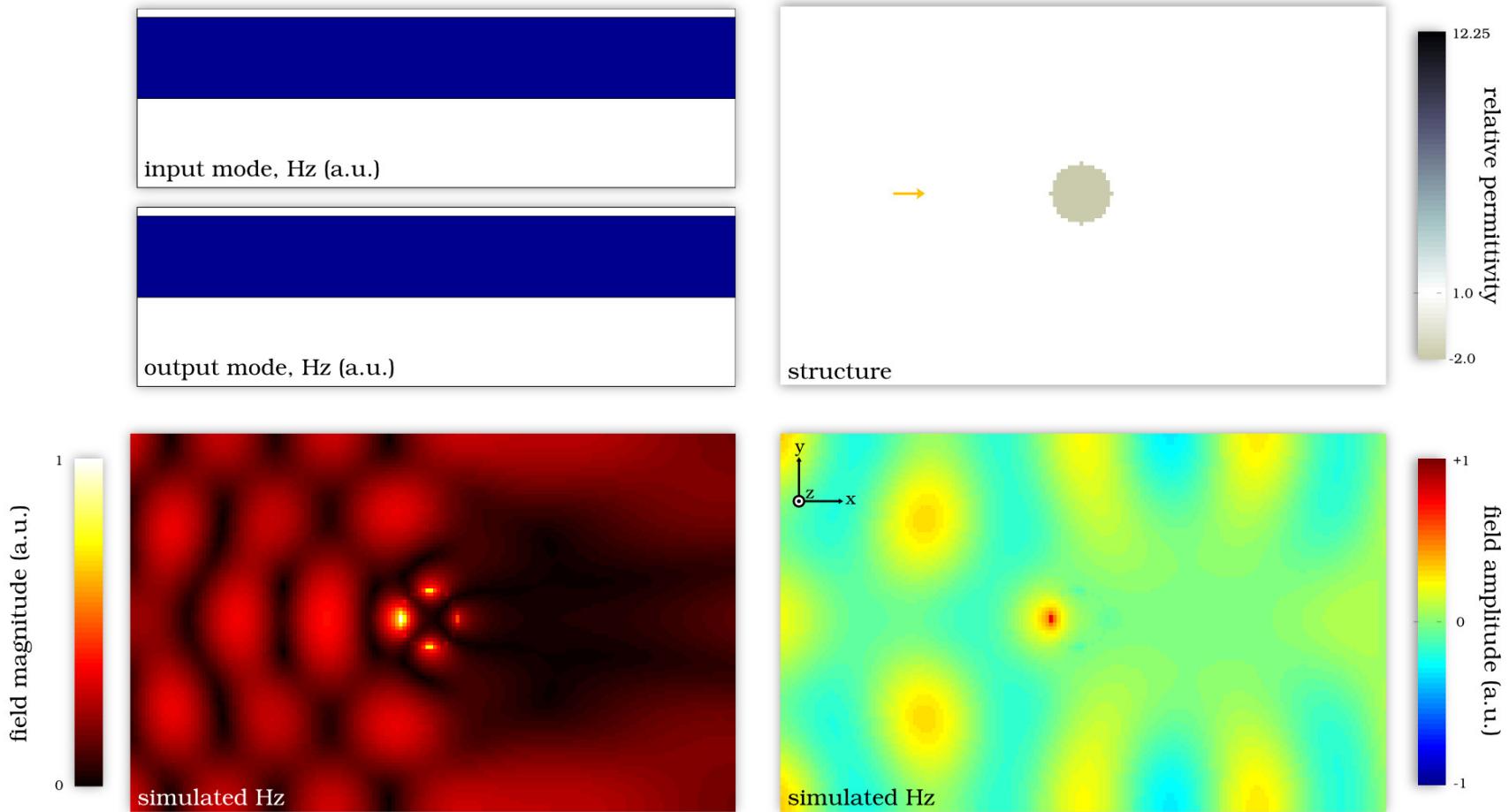


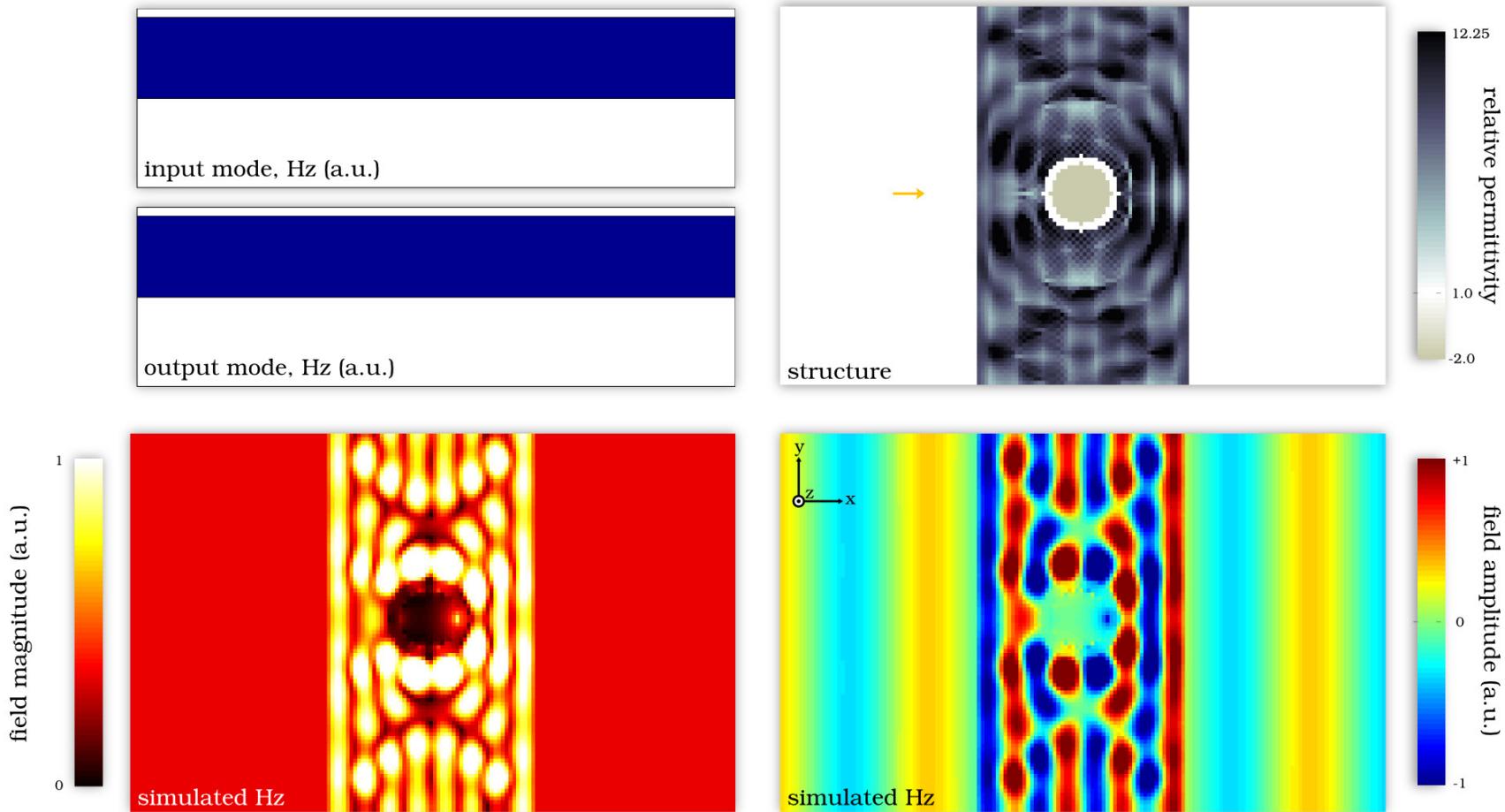


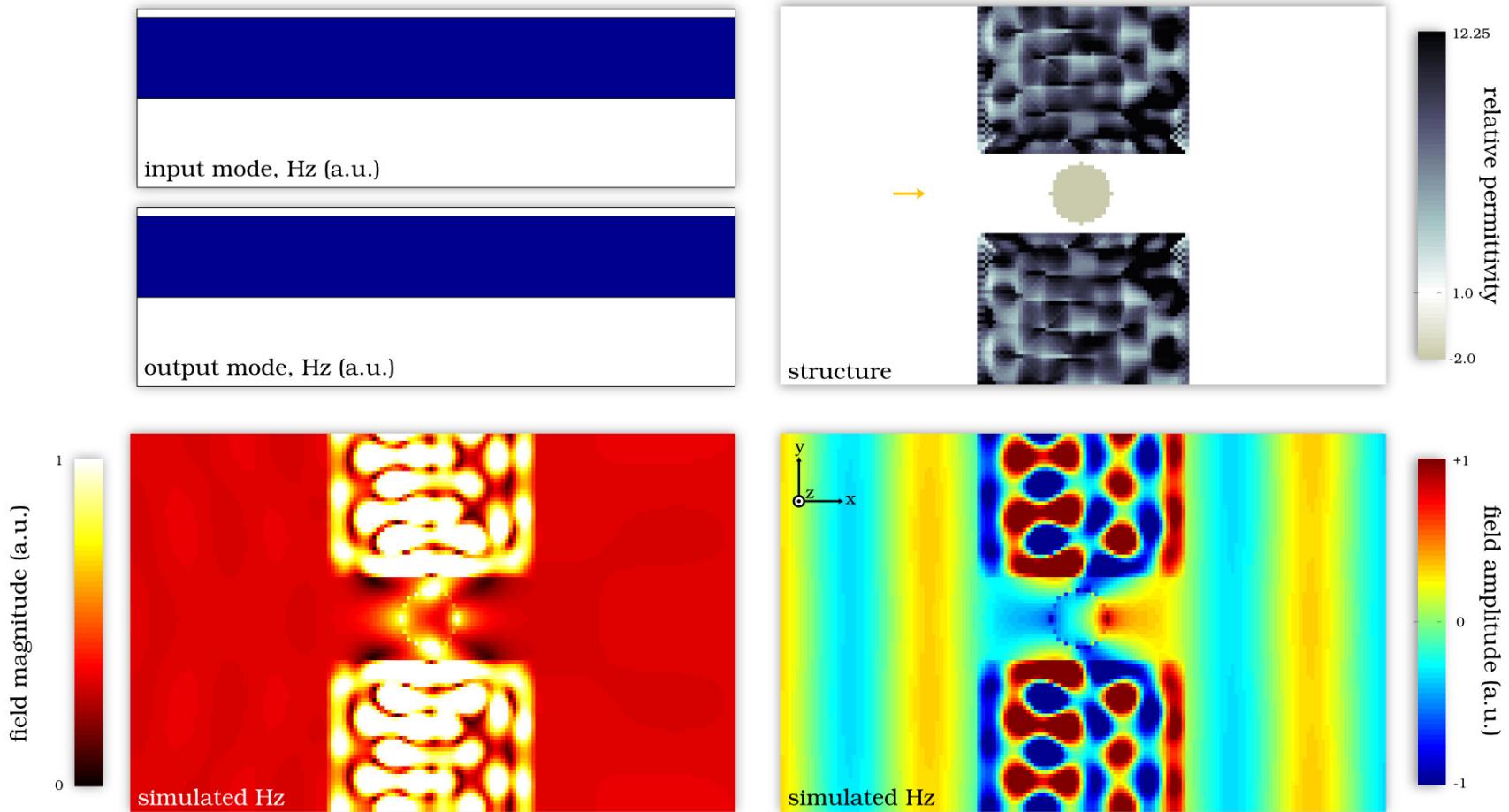
Ob-1, metamaterials also do, you must.

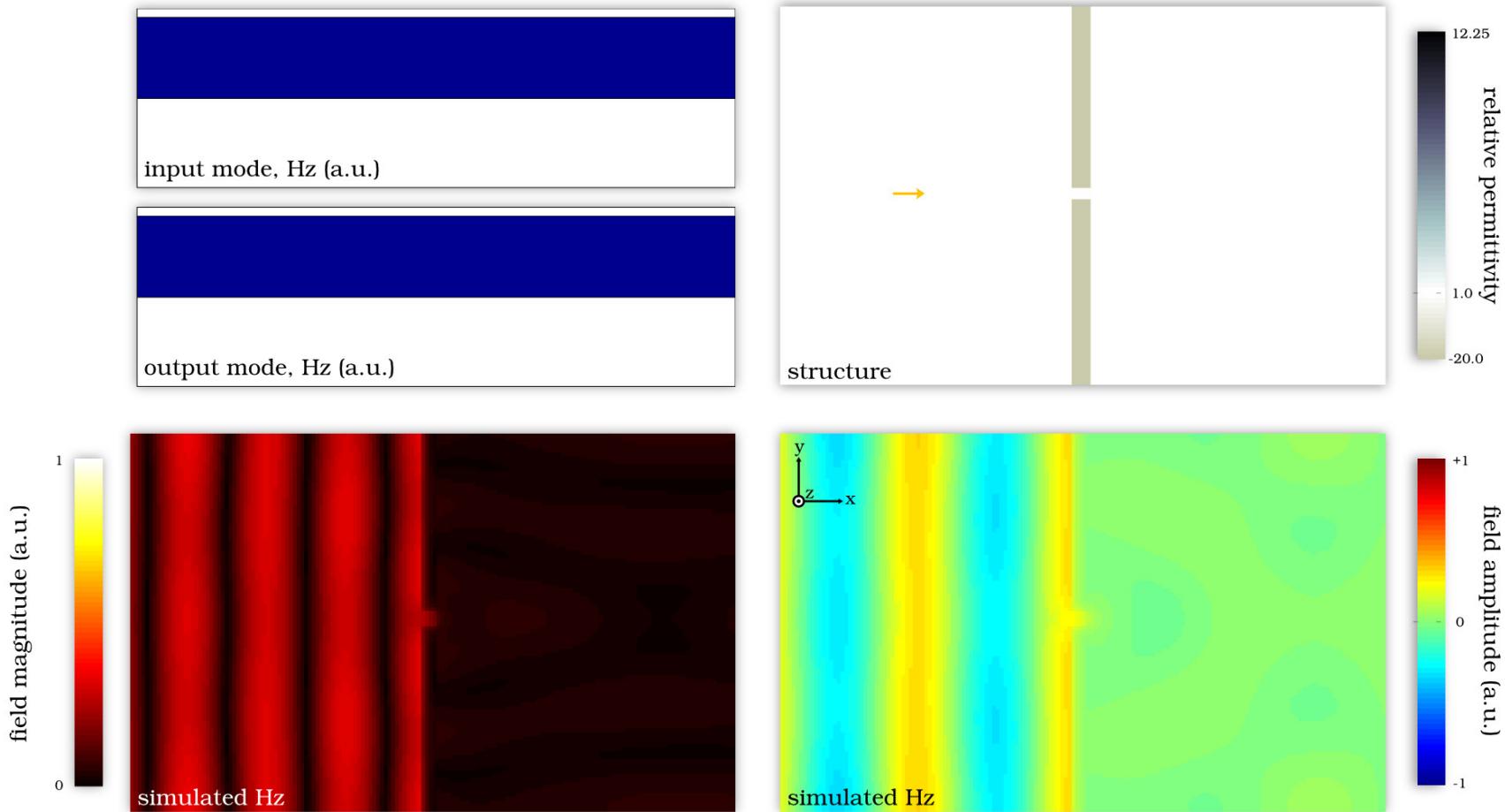
- Try two classes: cloaks and mimics.
- Only modification: periodic boundary conditions on top and bottom.
- Allows for plane waves, and
- consequently only need f_{ideal} at left and right (not top and bottom).

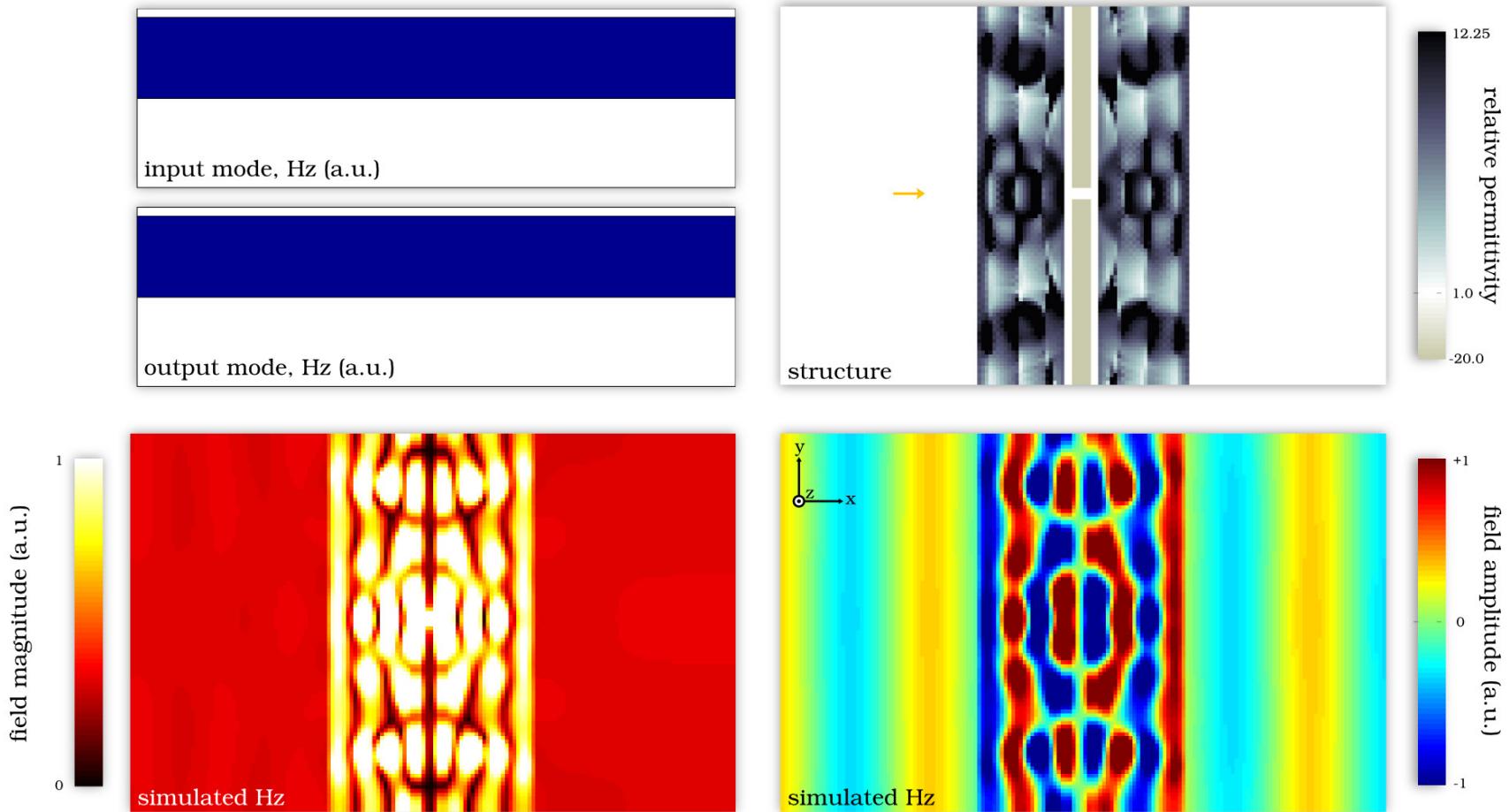


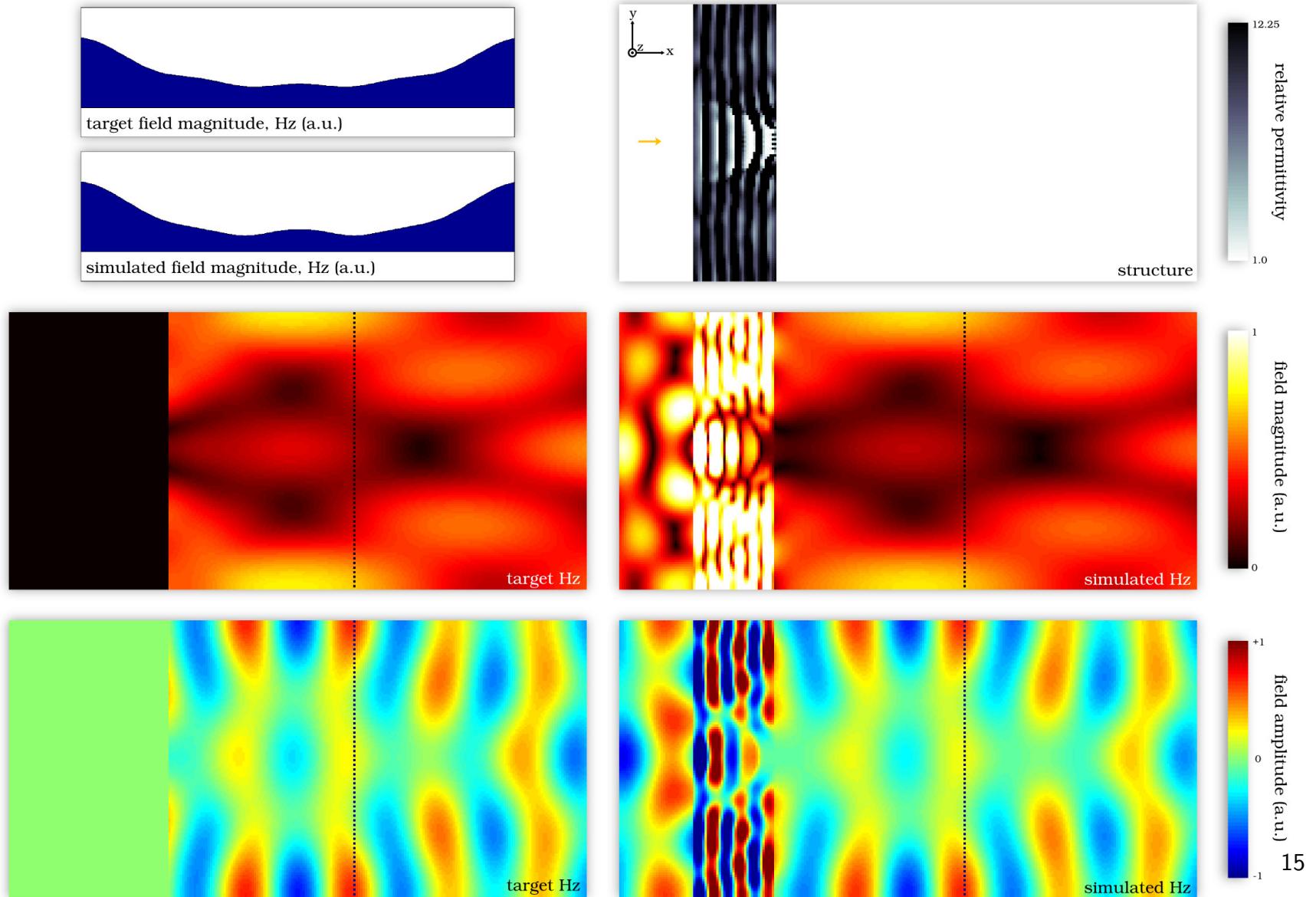


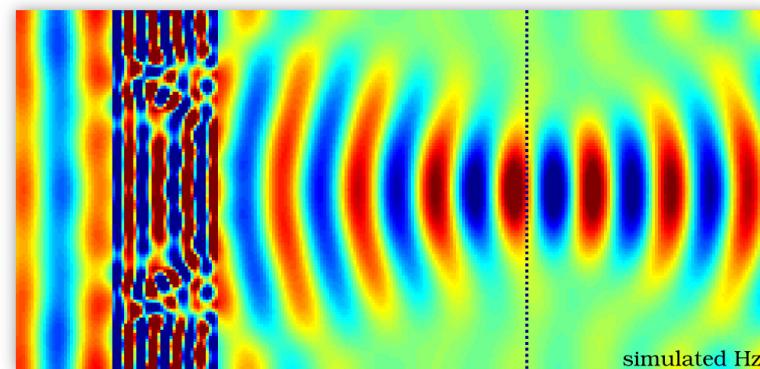
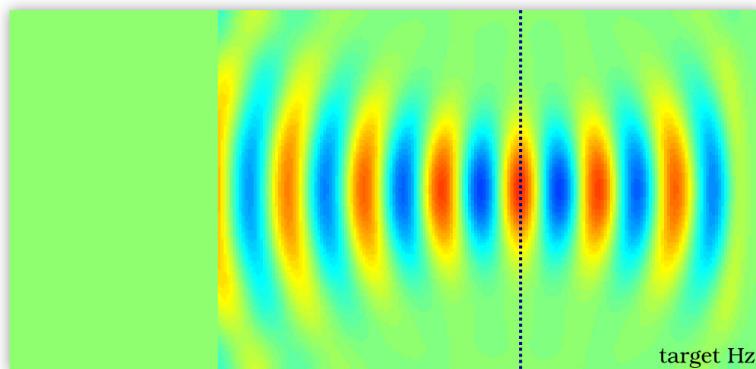
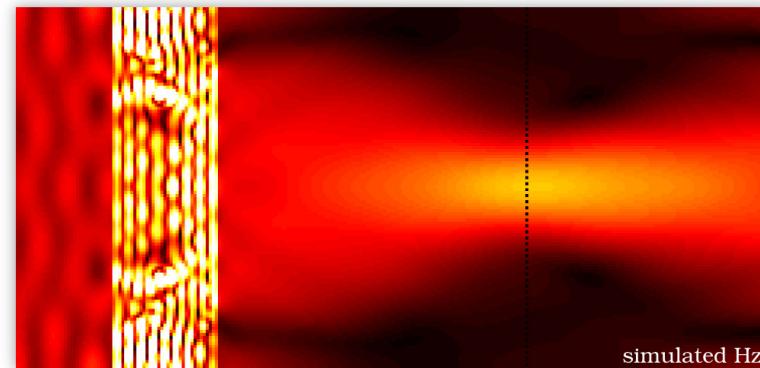
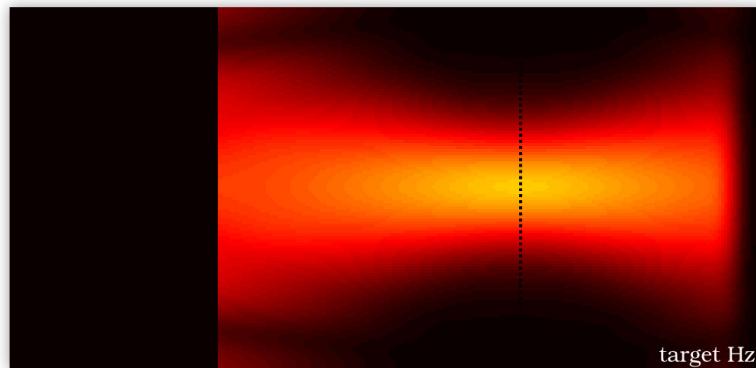
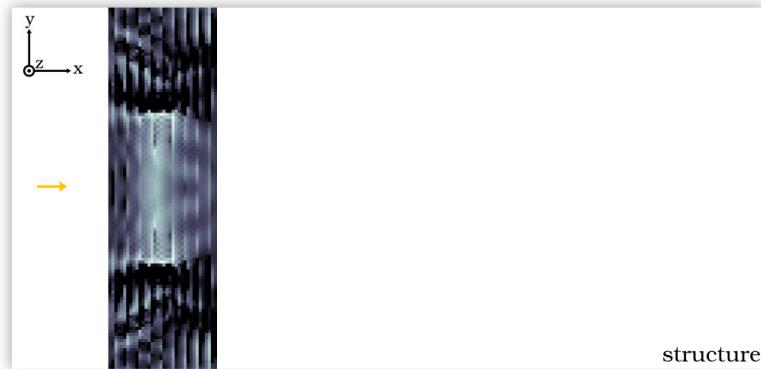
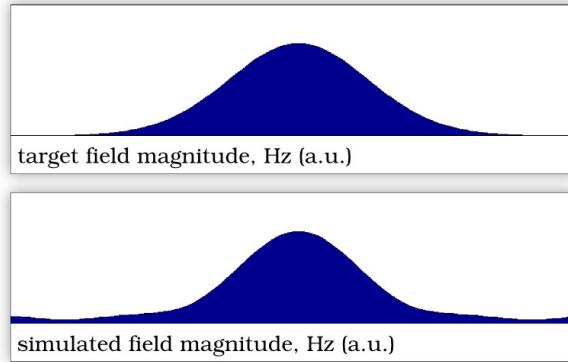


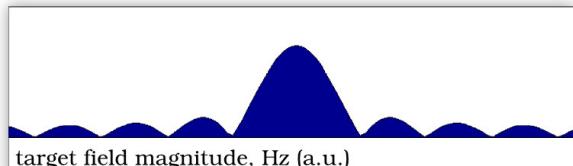




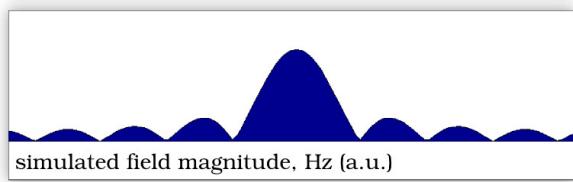




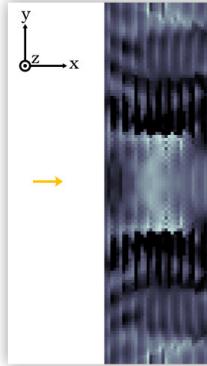




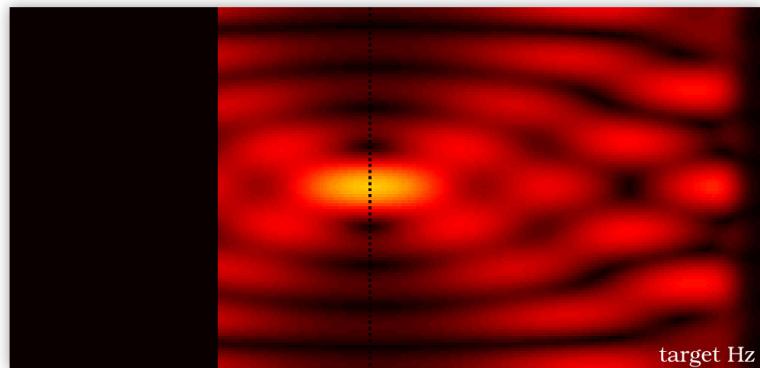
target field magnitude, Hz (a.u.)



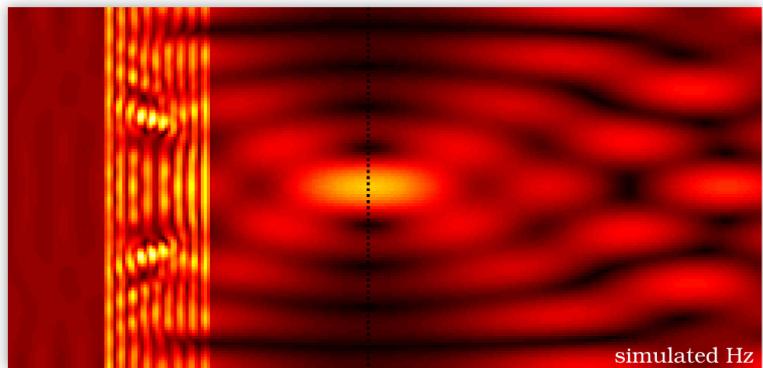
simulated field magnitude, Hz (a.u.)



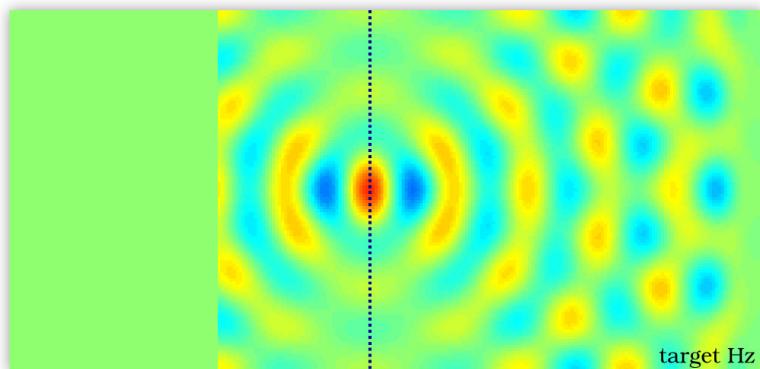
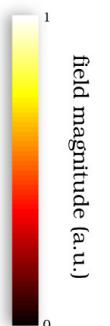
structure



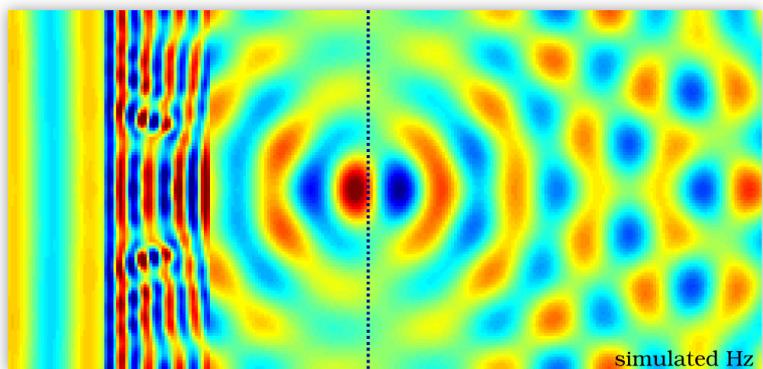
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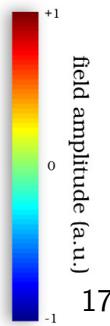
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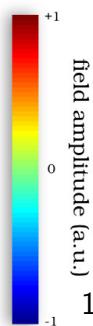
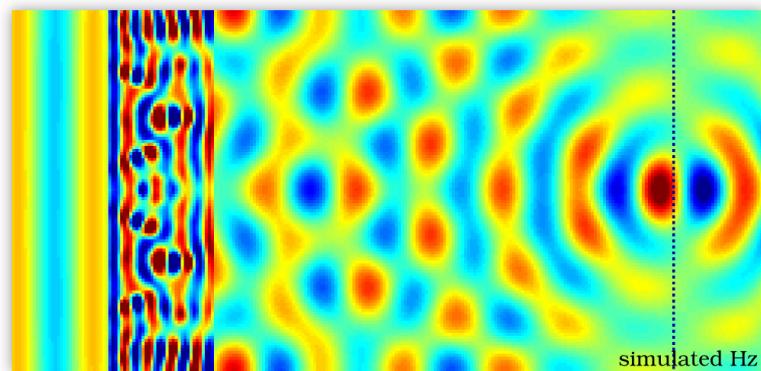
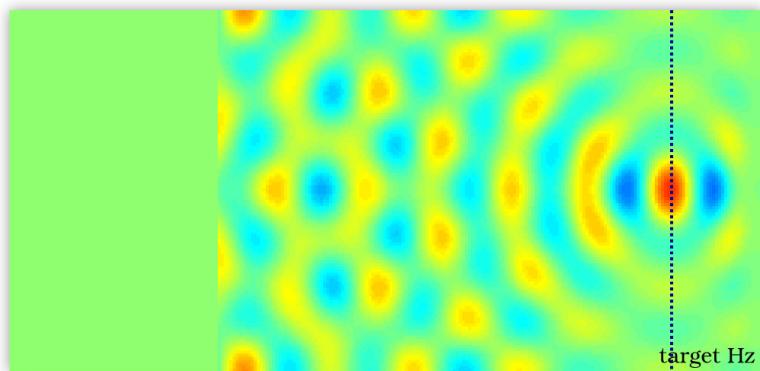
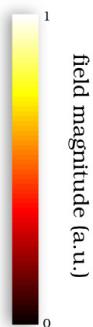
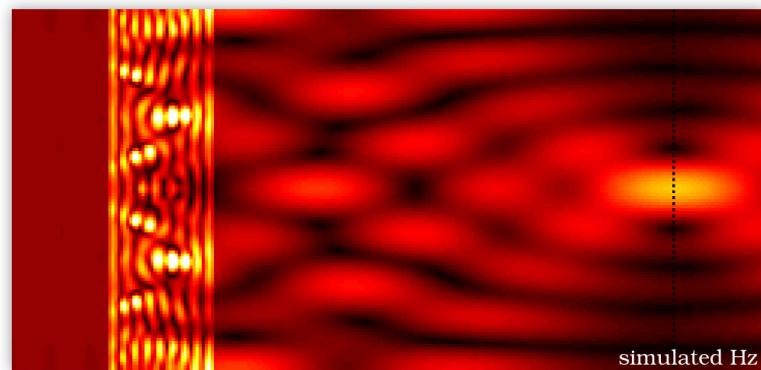
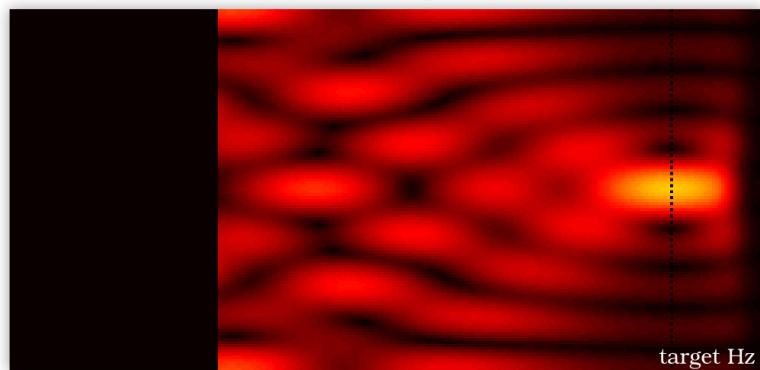
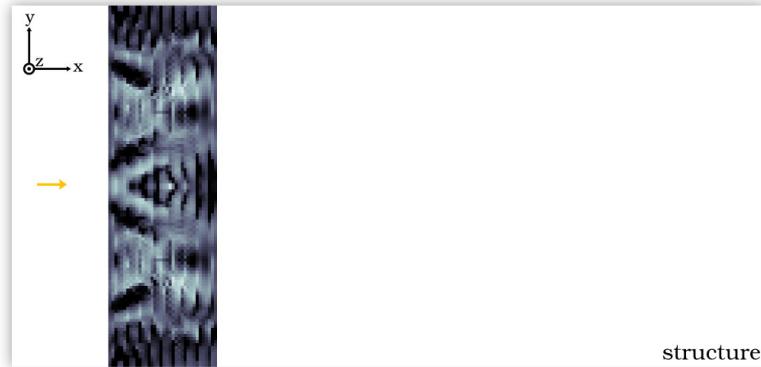
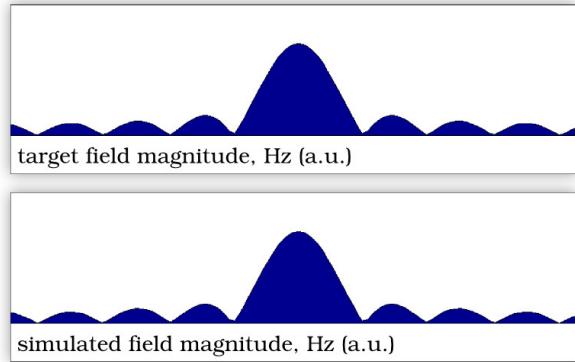


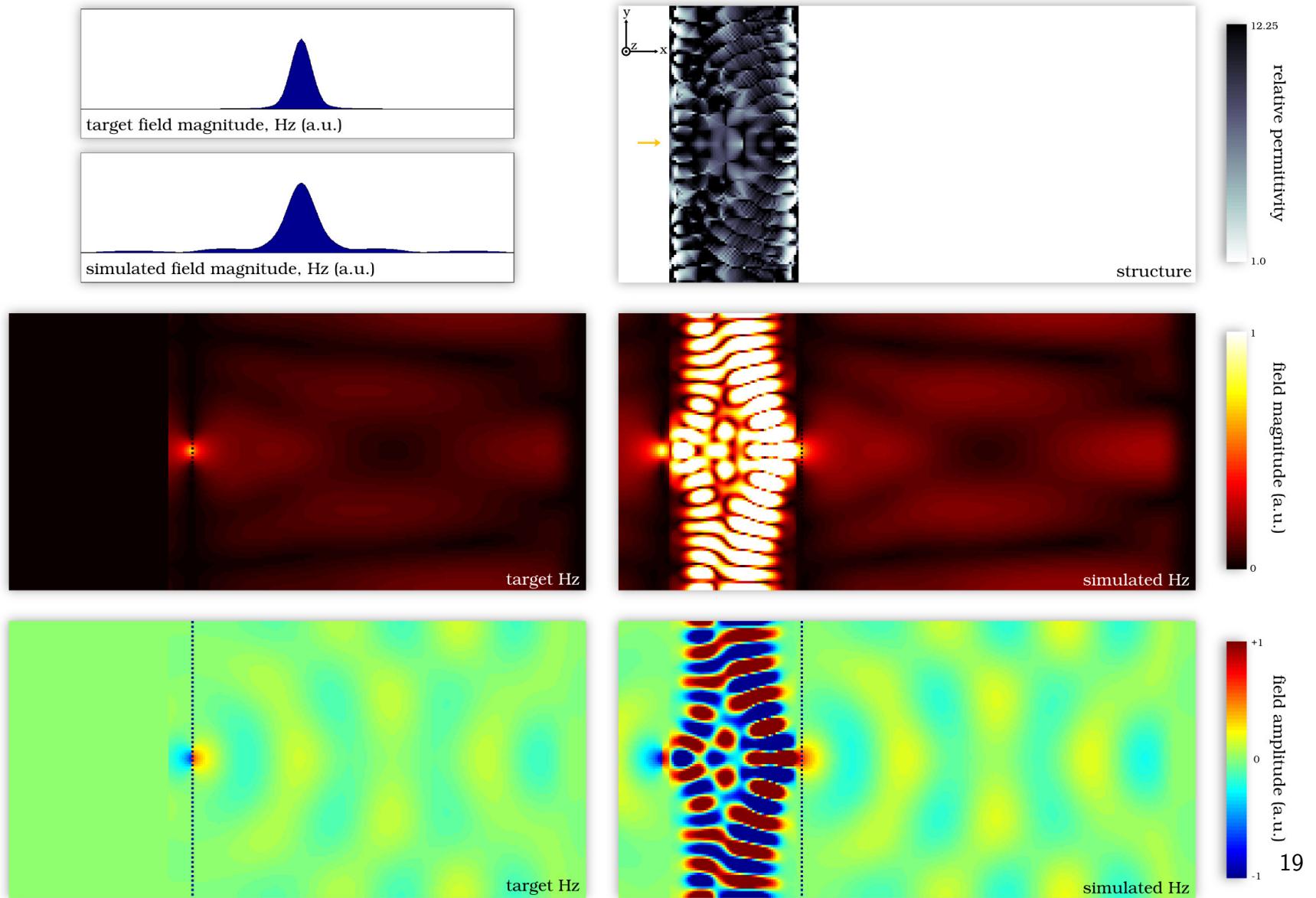
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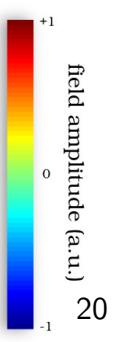
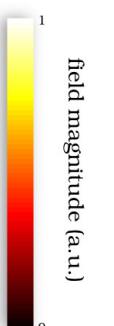
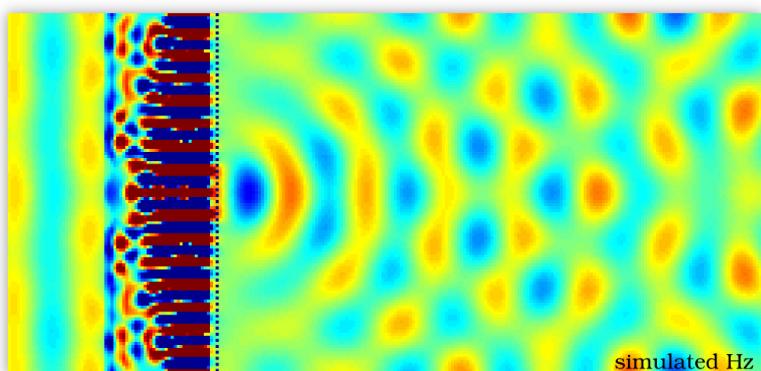
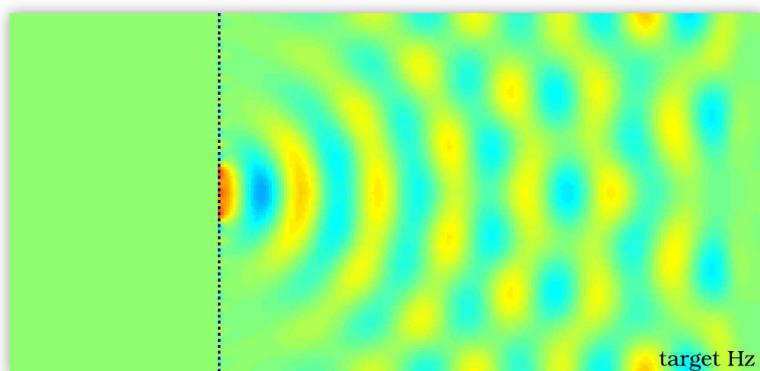
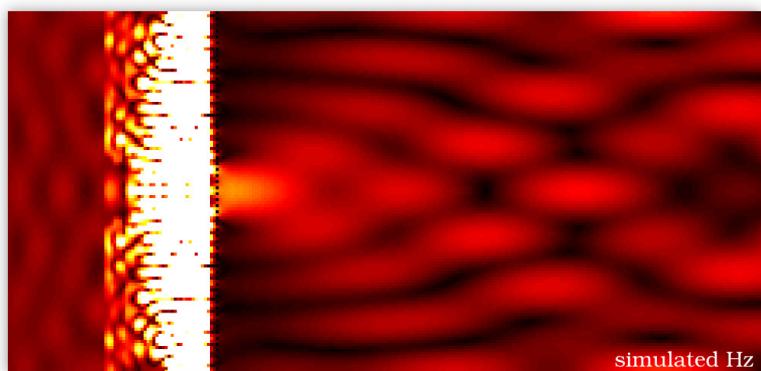
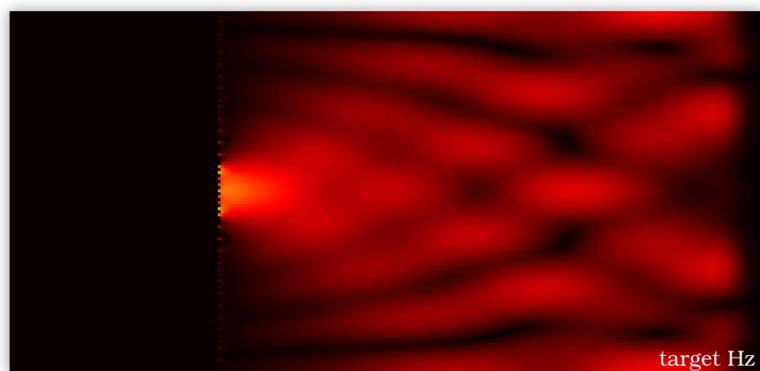
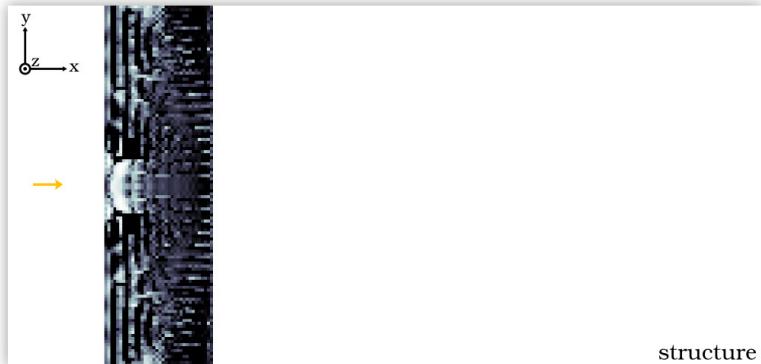
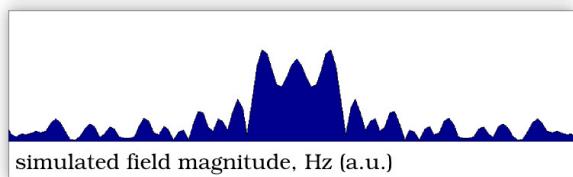
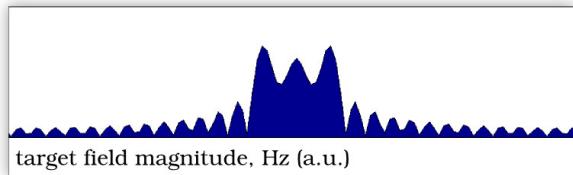


simulated Hz

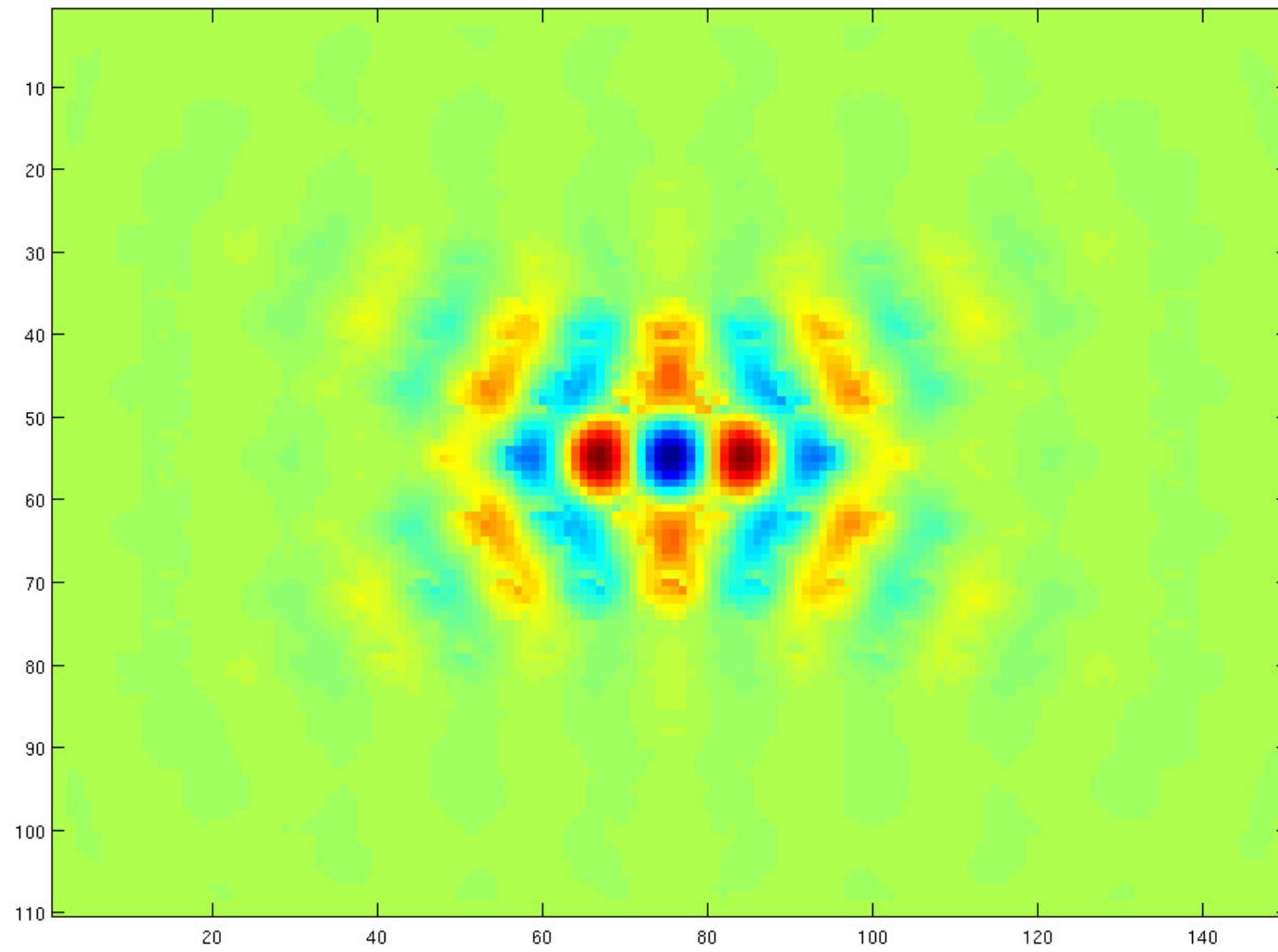


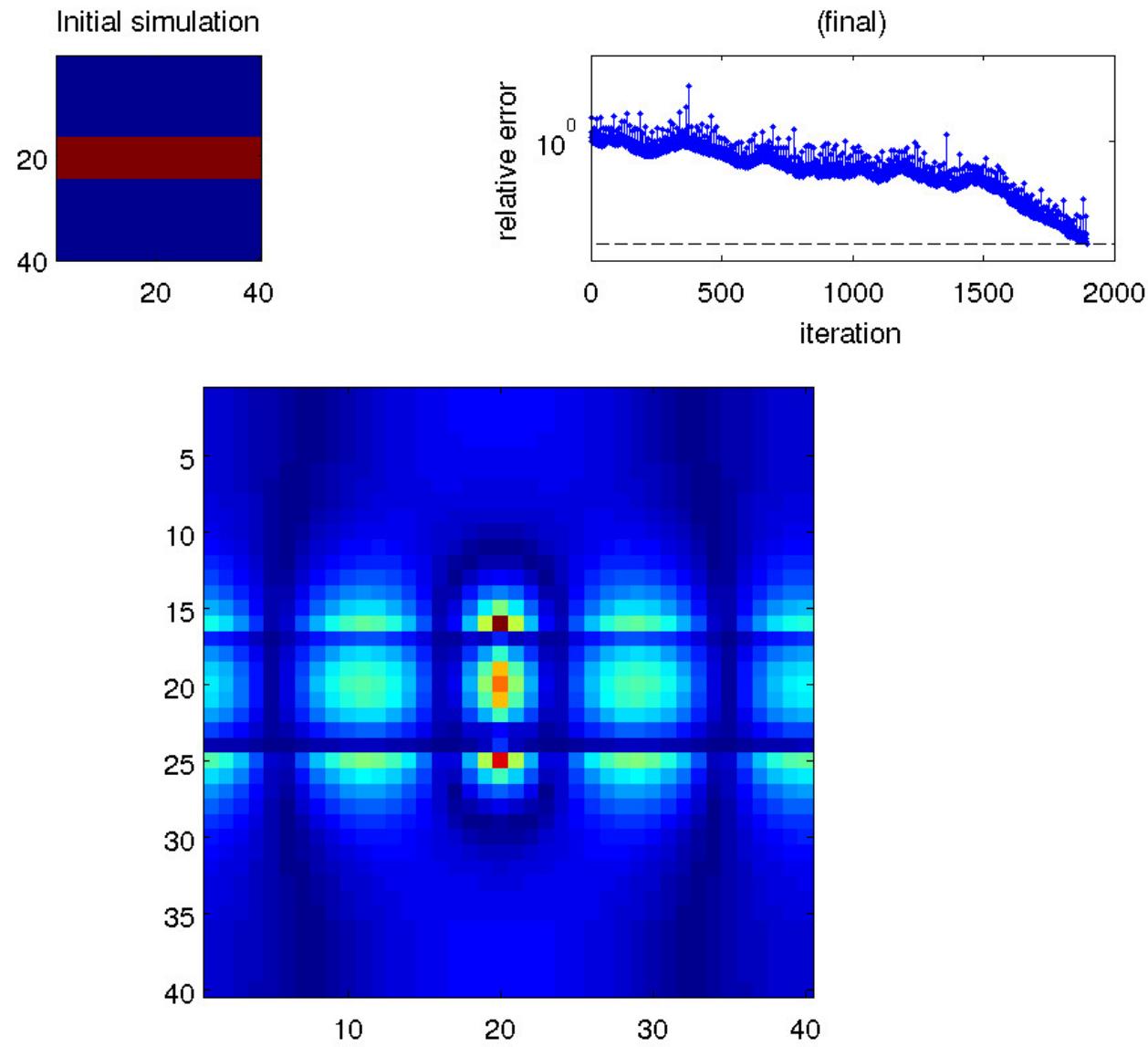


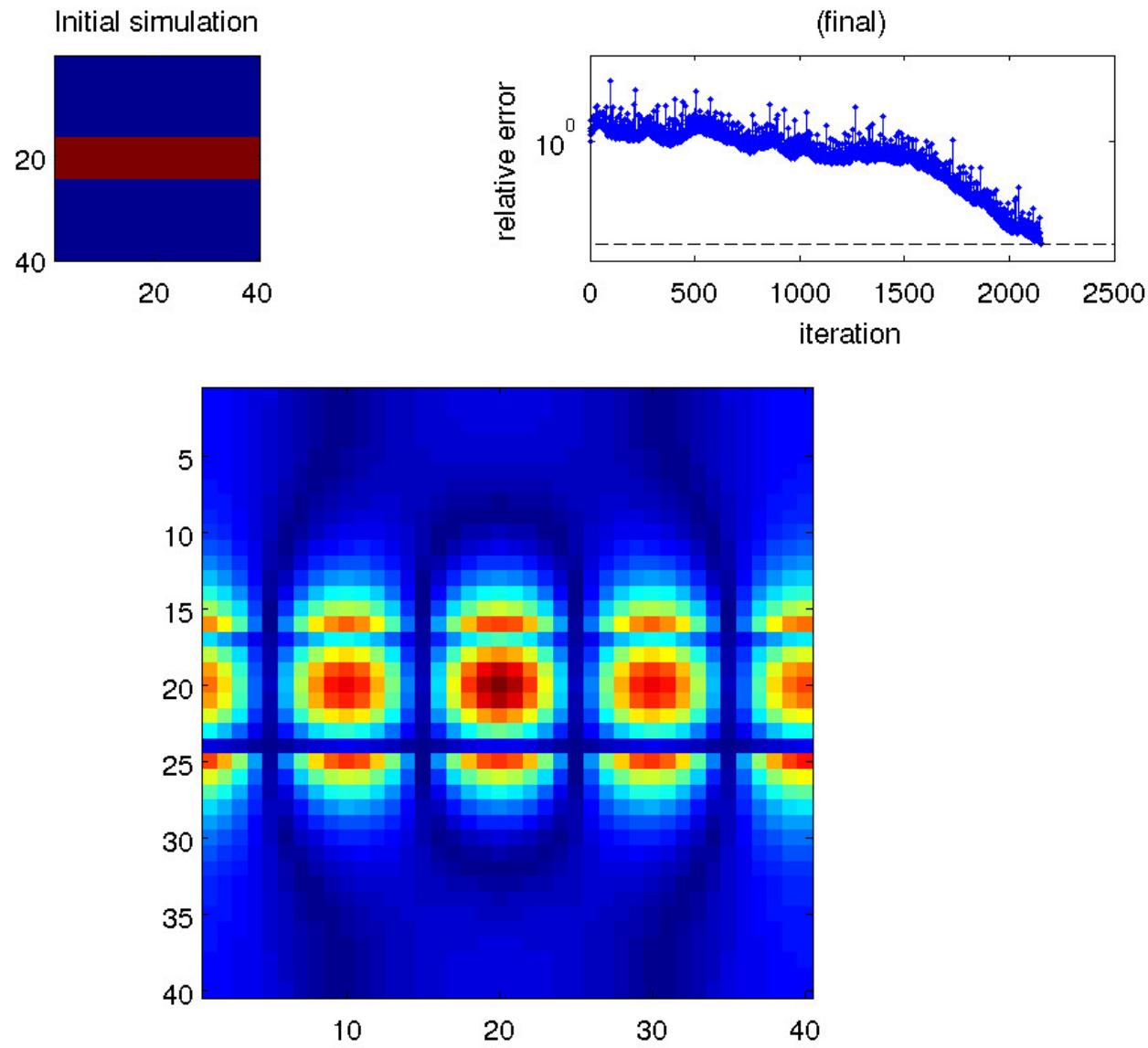


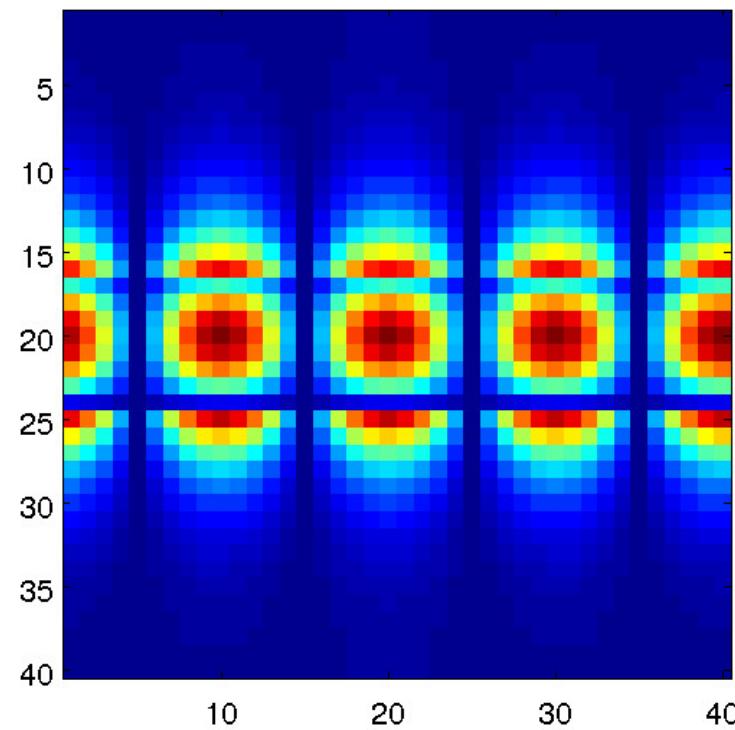
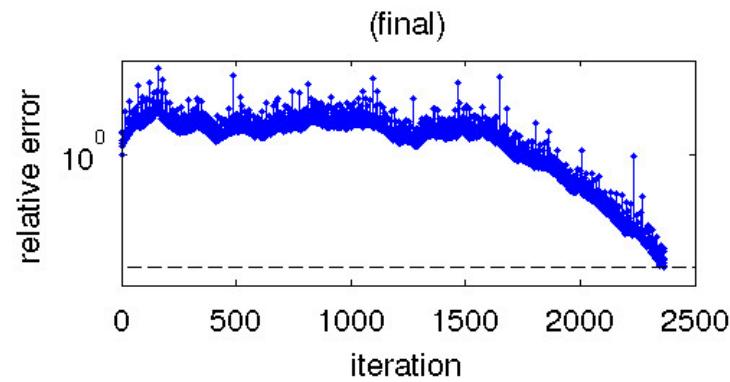
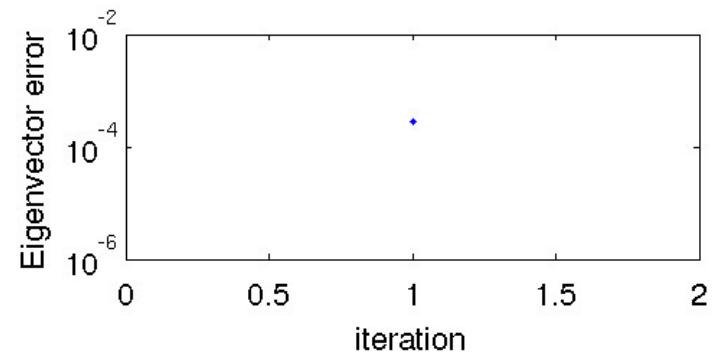


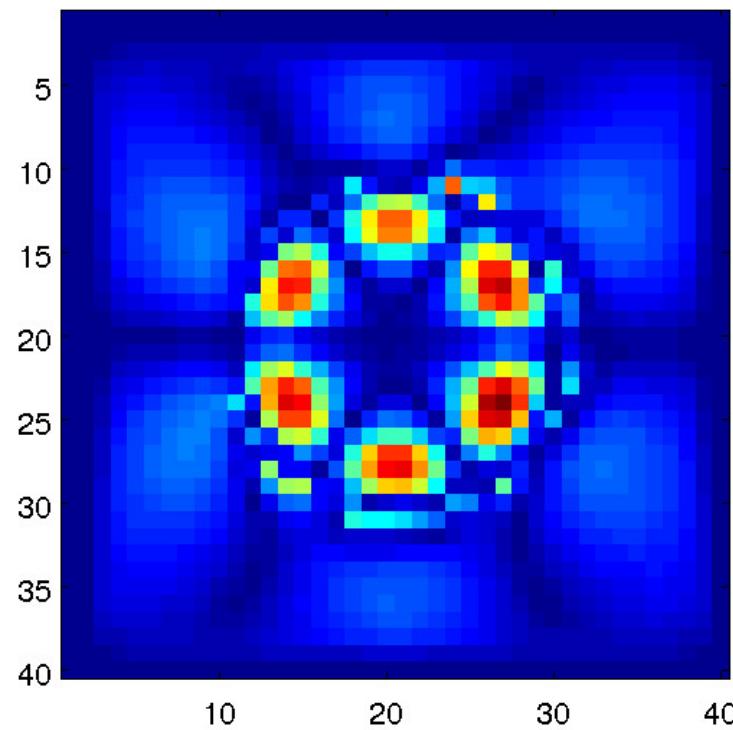
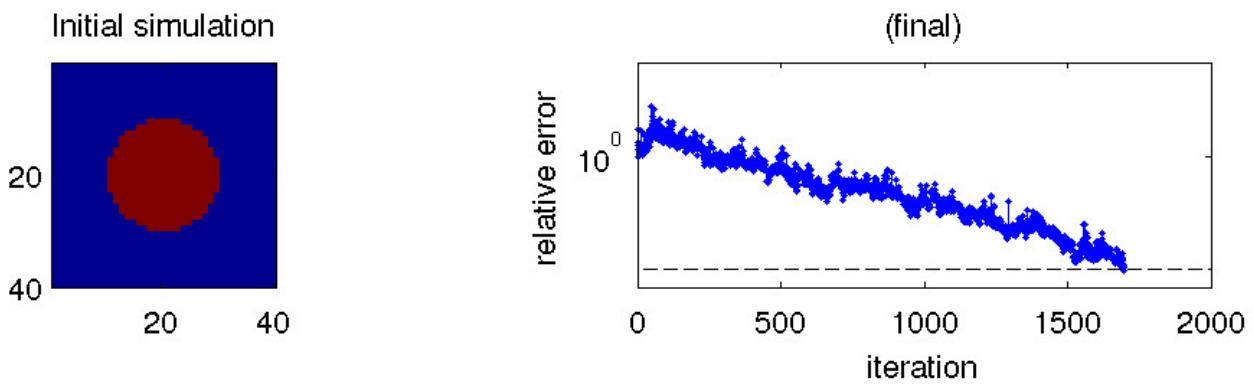
One more thing...

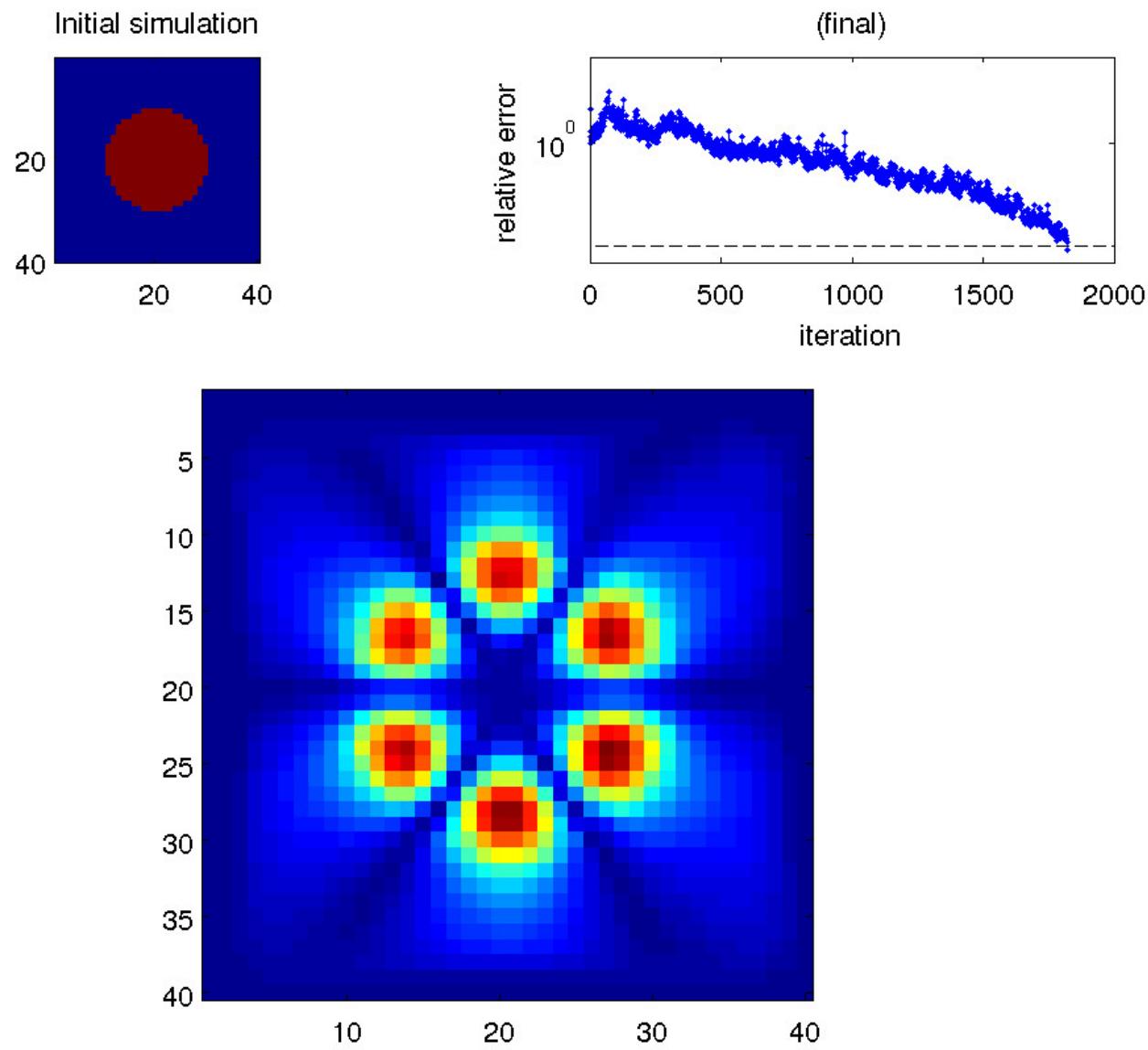


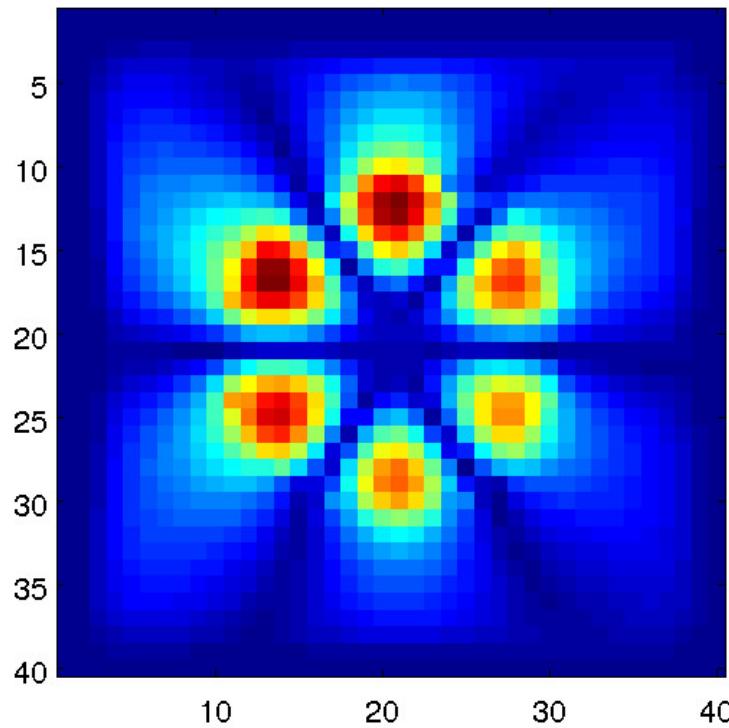
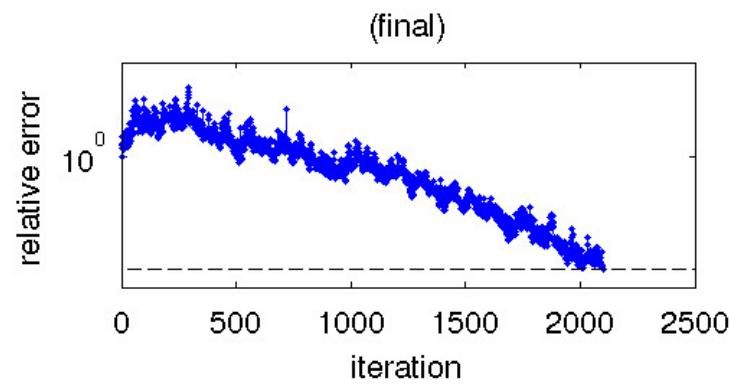
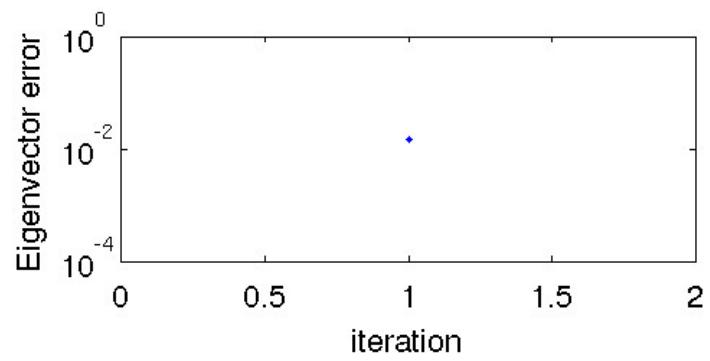


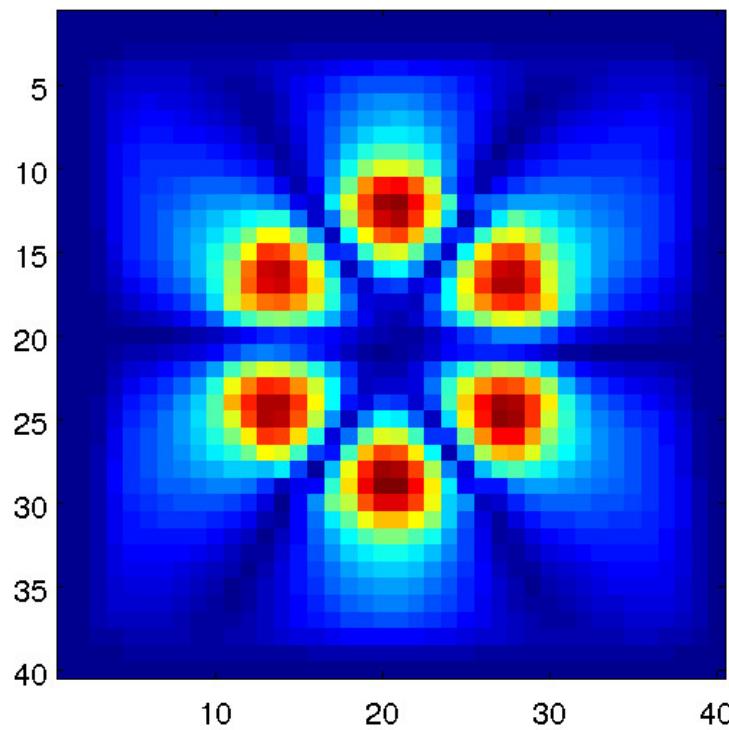
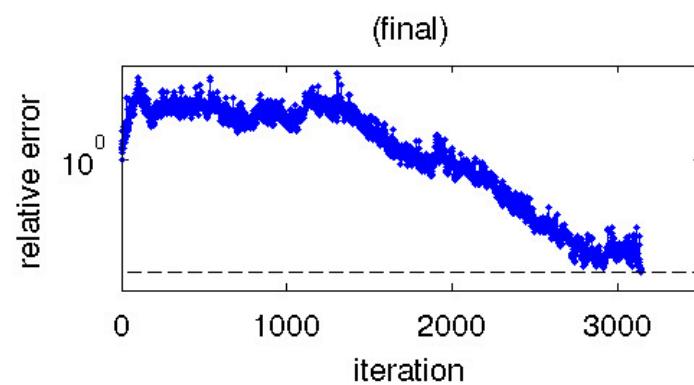
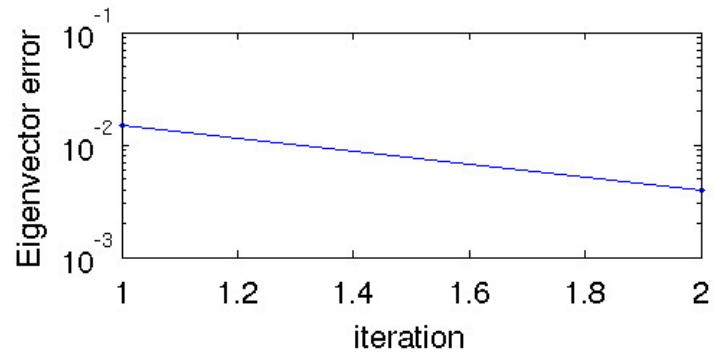


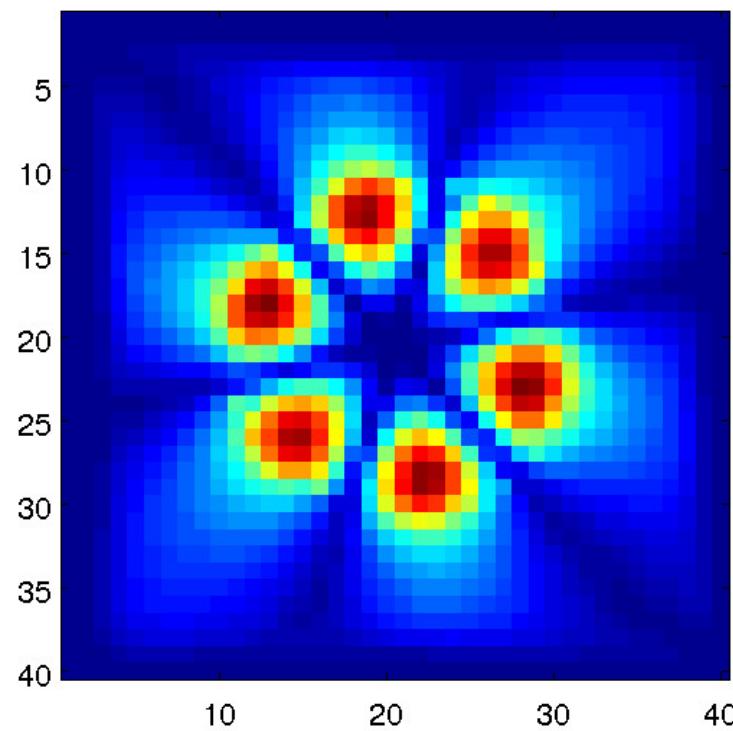
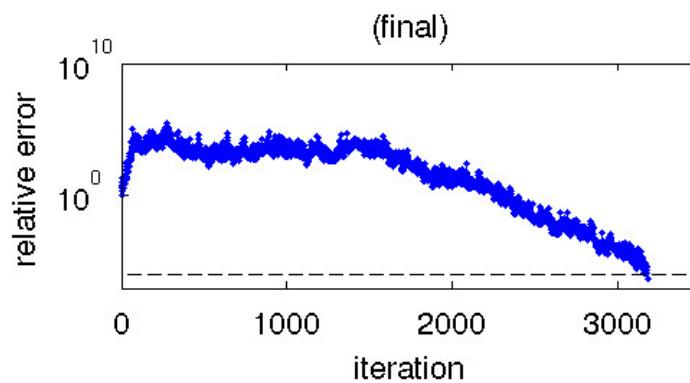
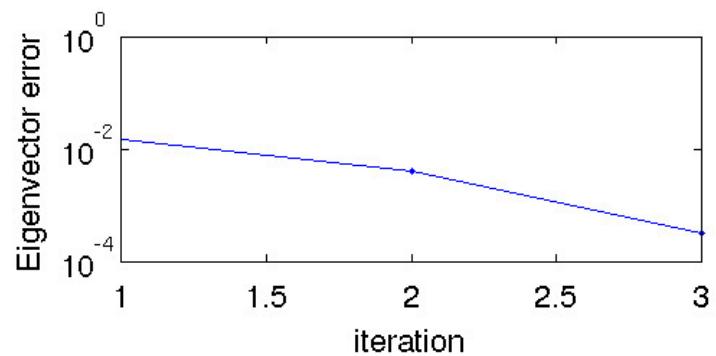




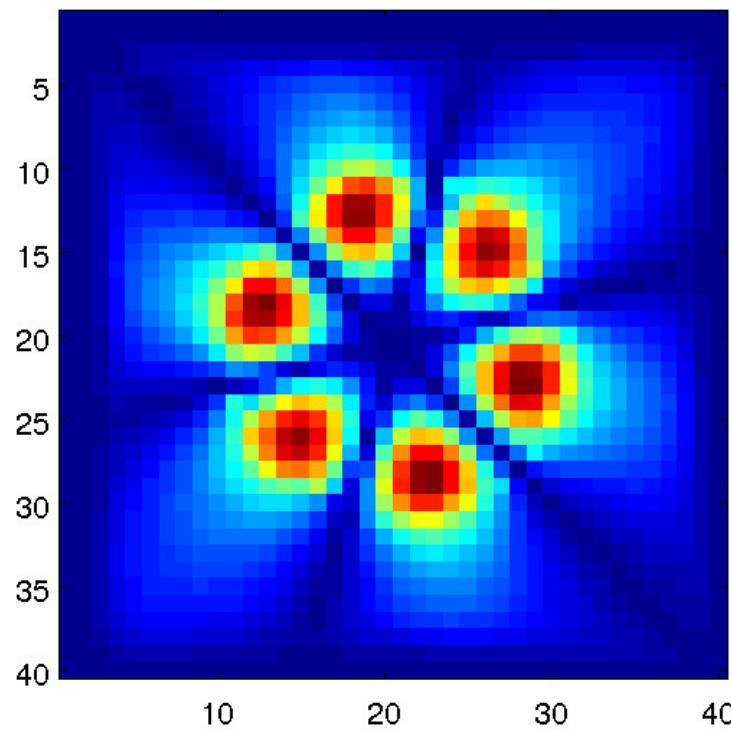
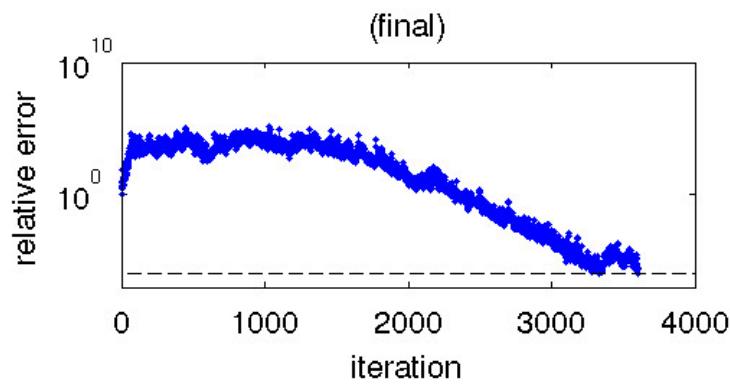
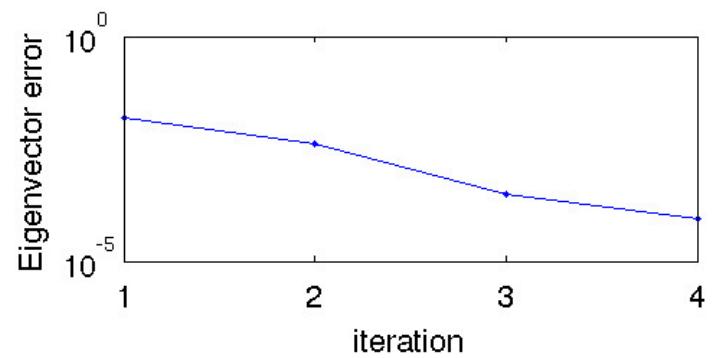


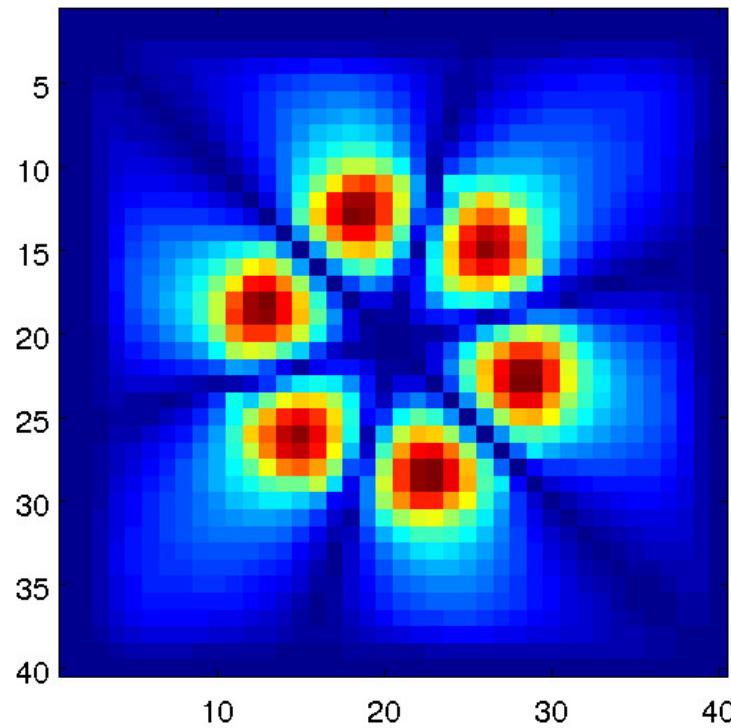
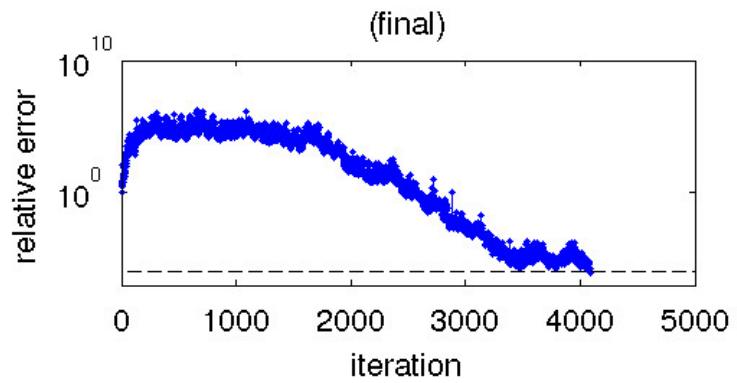
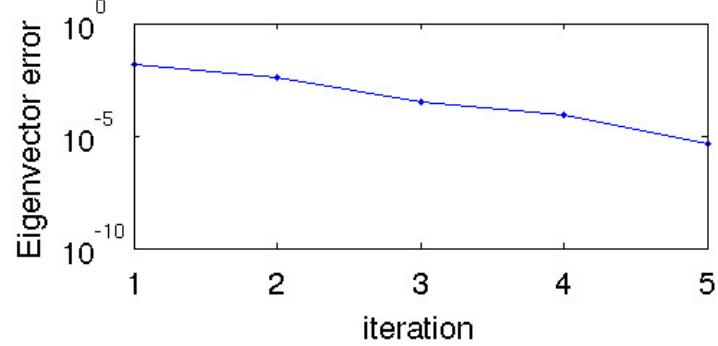


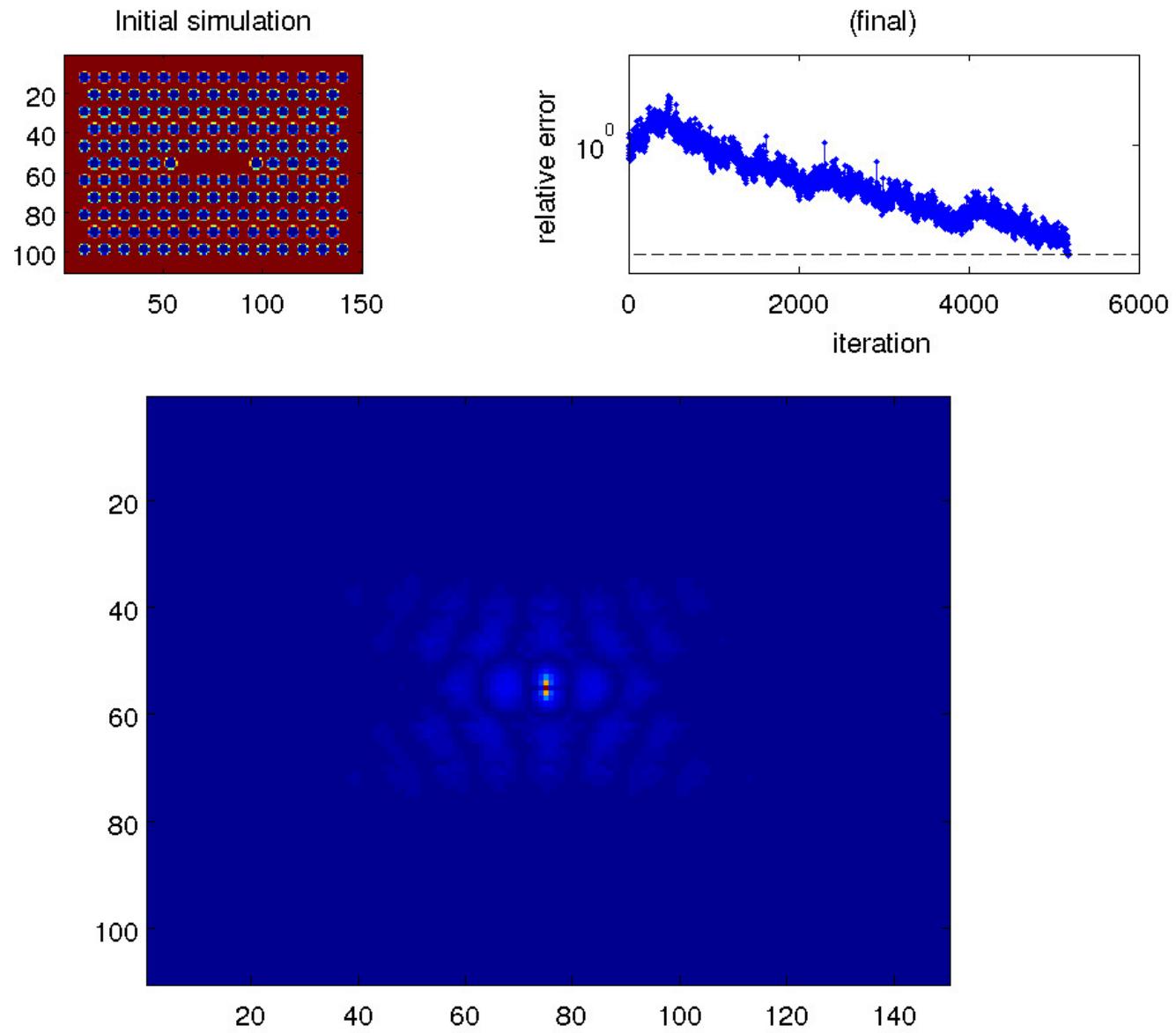


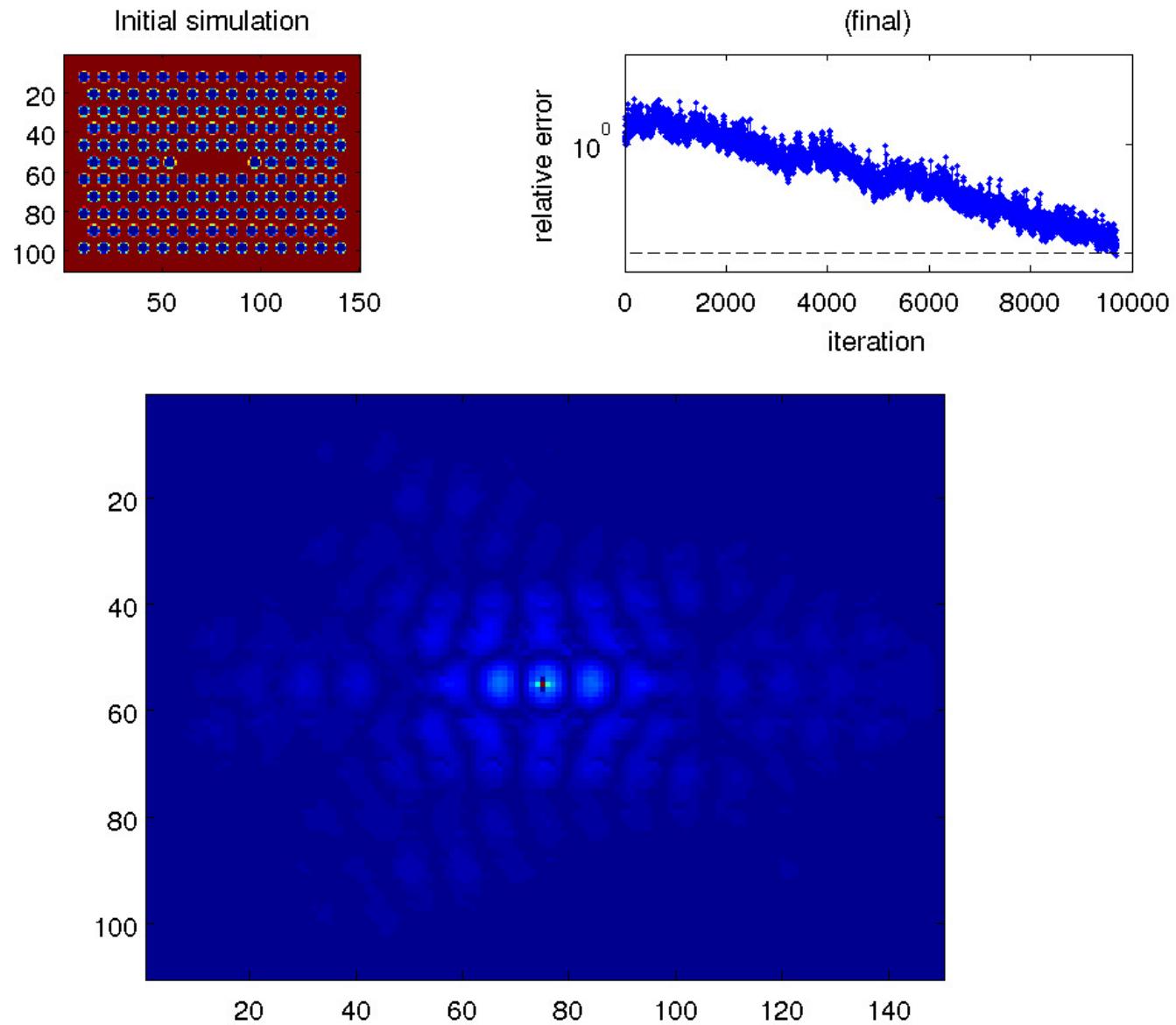


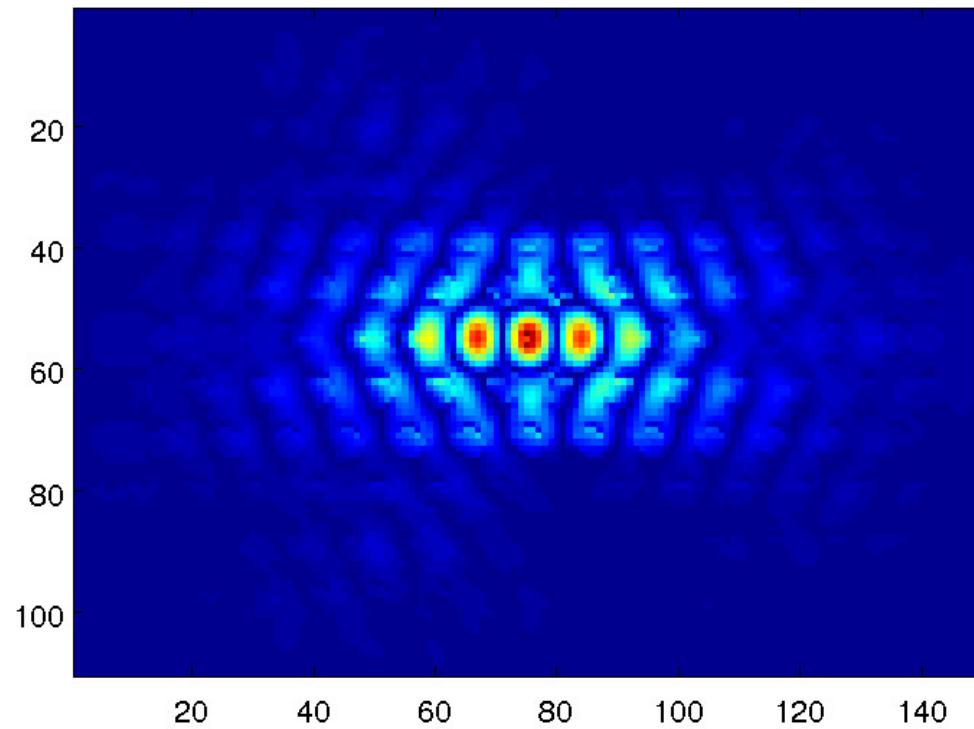
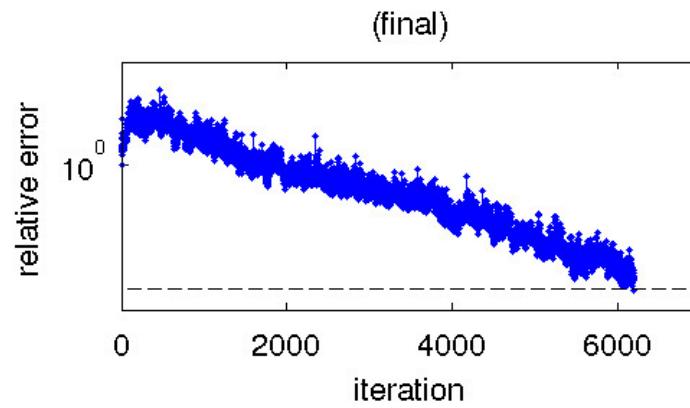
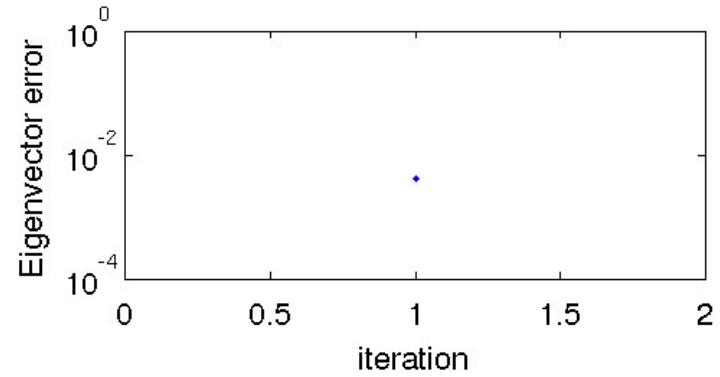
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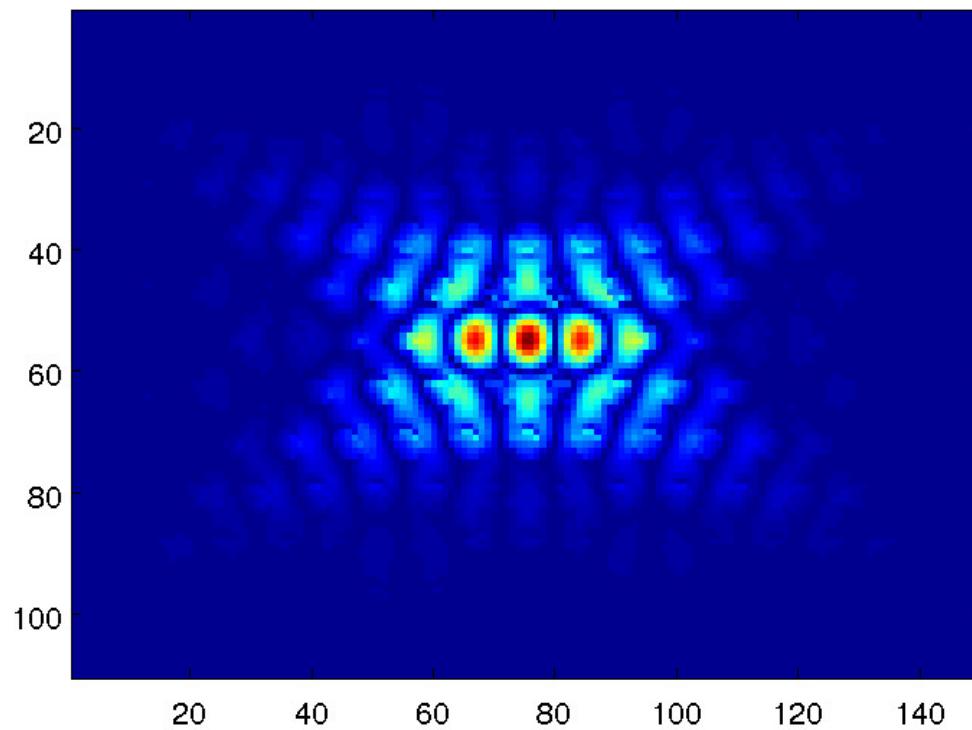
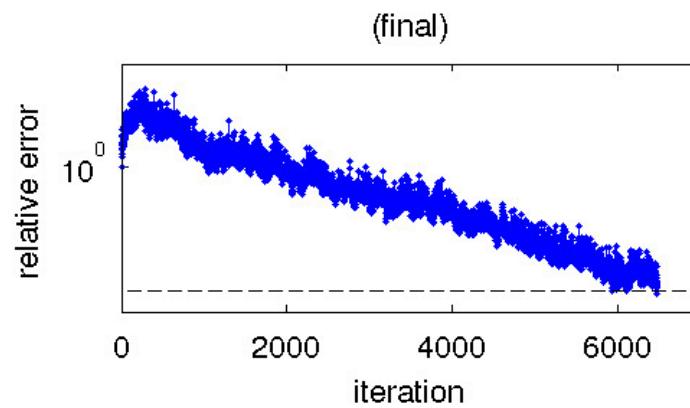
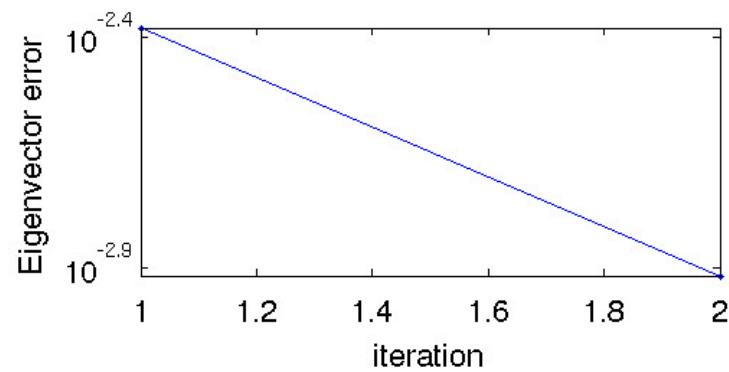


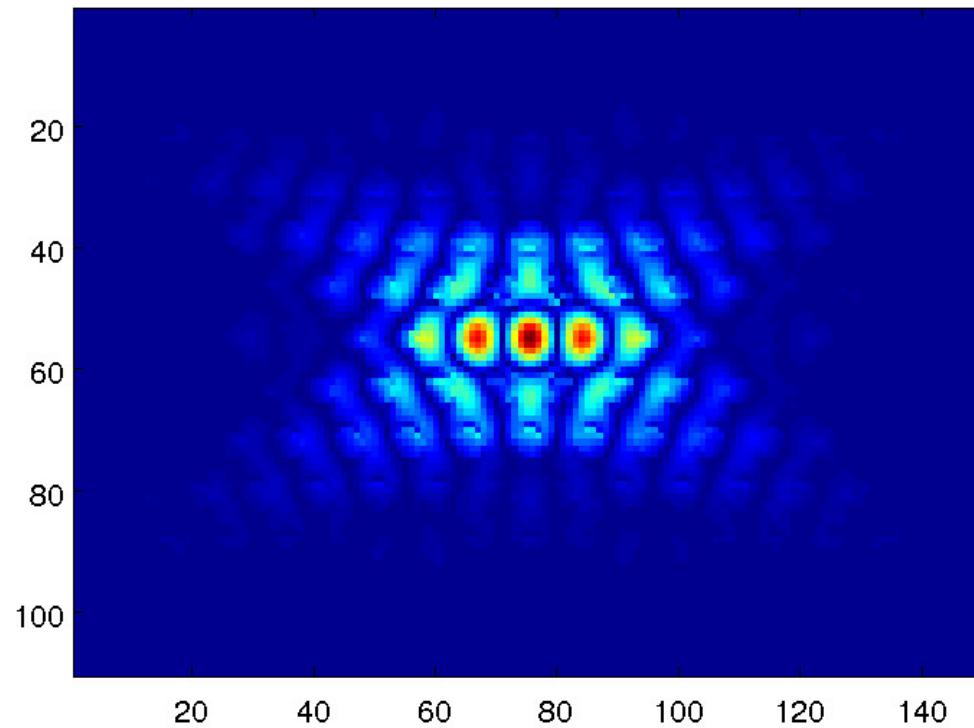
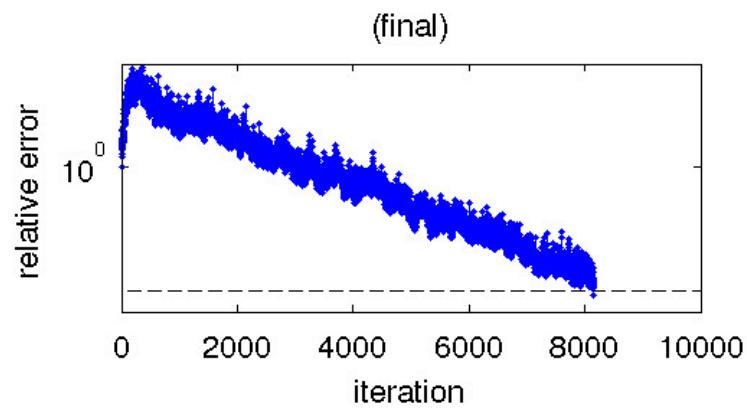
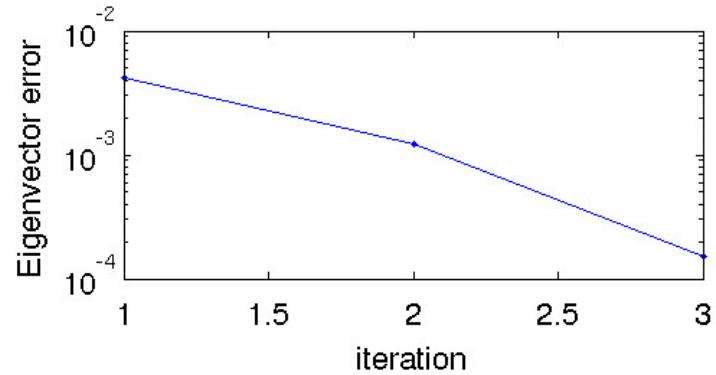


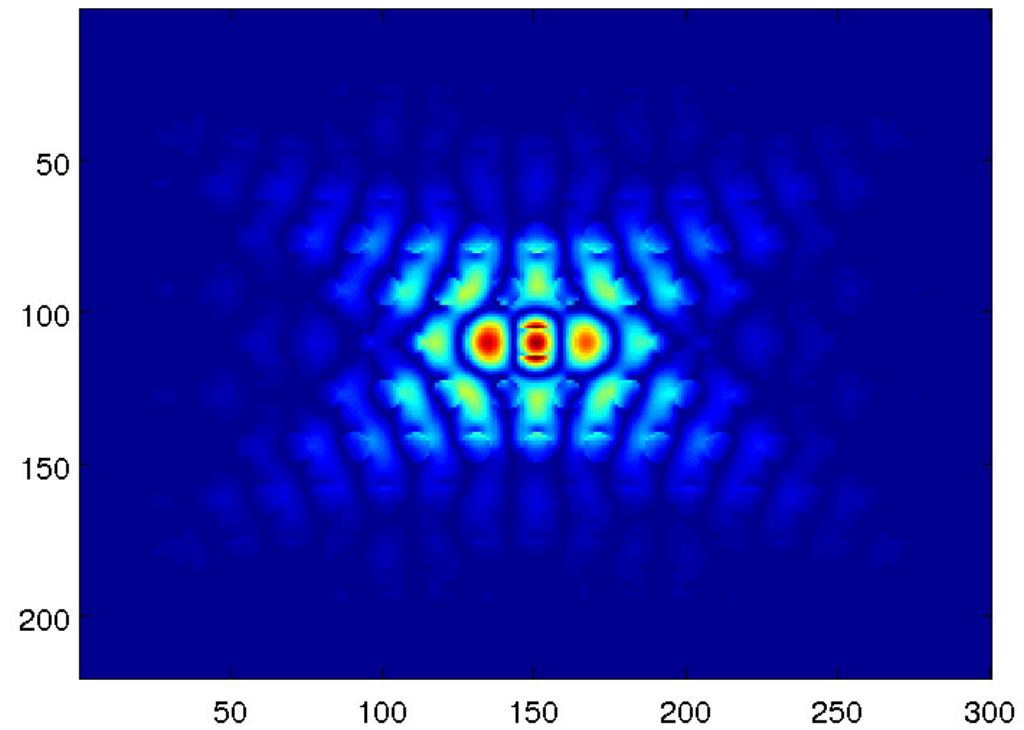
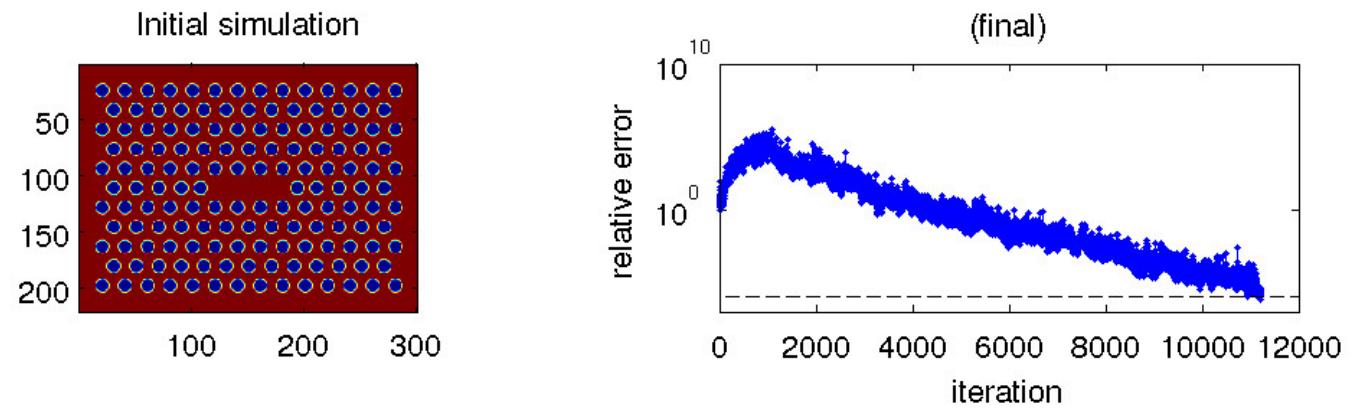


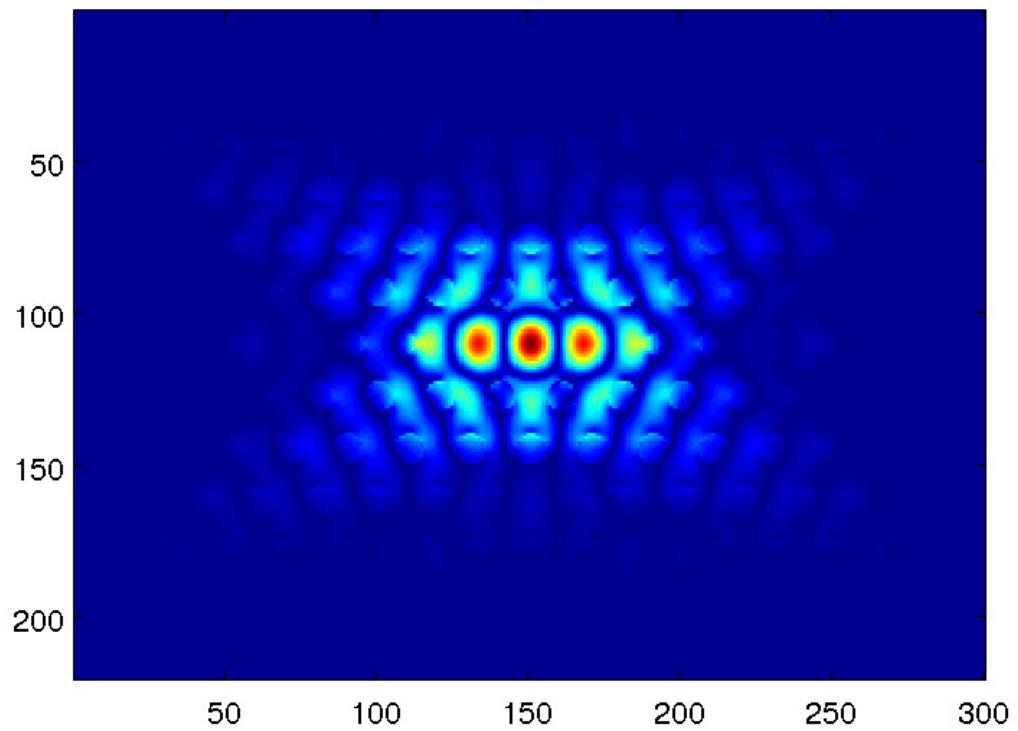
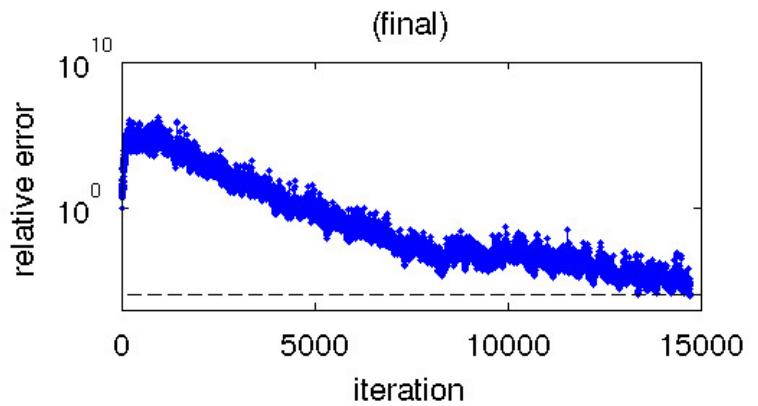
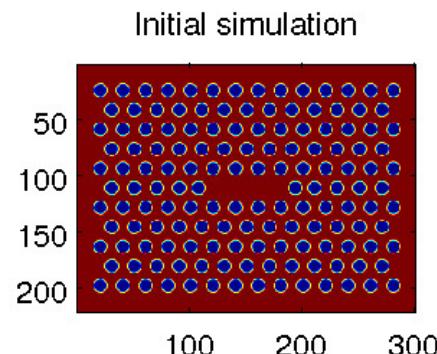


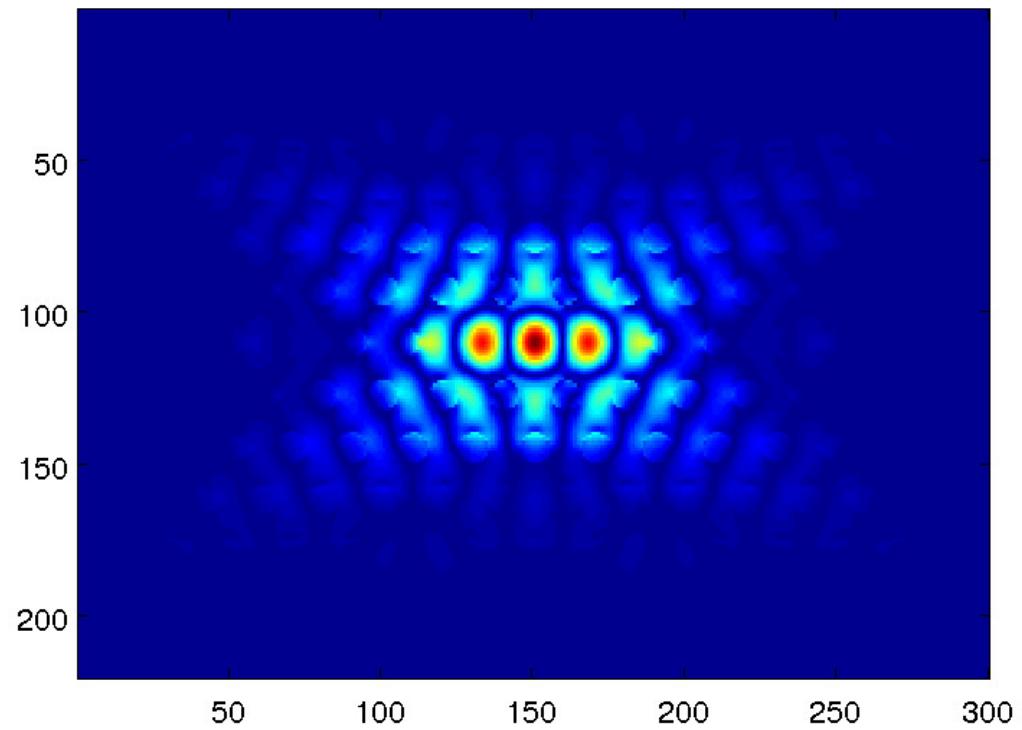
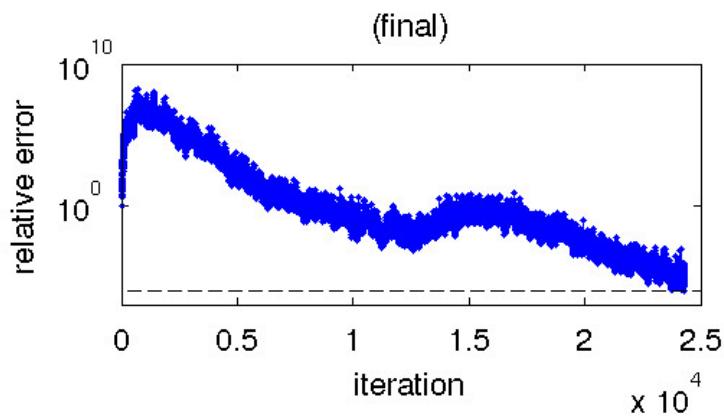
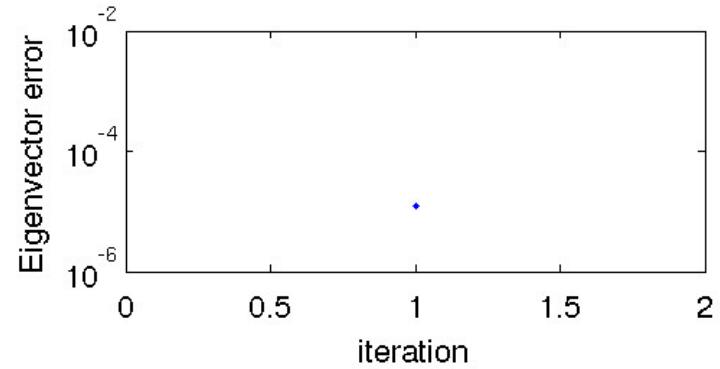












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