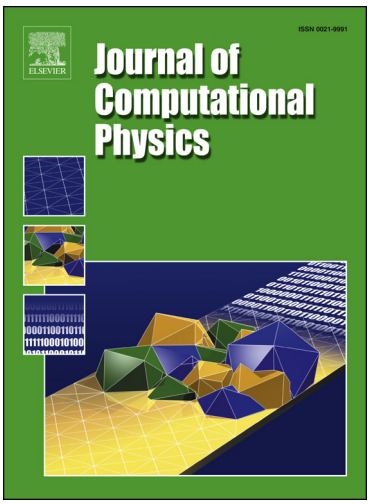
Accepted Manuscript



Hybrid Newmark-conformal FDTD modeling of thin spoof plasmonic metamaterials

Kazuhiro Fujita

PII: S0021-9991(18)30652-1
DOI: https://doi.org/10.1016/j.jcp.2018.09.050
Reference: YJCPH 8297

To appear in: *Journal of Computational Physics*

Received date: 26 June 2018
Revised date: 20 September 2018
Accepted date: 28 September 2018

Please cite this article in press as: K. Fujita, Hybrid Newmark-conformal FDTD modeling of thin spoof plasmonic metamaterials, *J. Comput. Phys.* (2018), https://doi.org/10.1016/j.jcp.2018.09.050

Highlights

- A new efficient and accurate semi-implicit finite-difference time-domain (FDTD) method is proposed for modeling thin plasmonic metamaterials supporting spoof surface plasmons.
- The proposed method is formulated by combining Yu-Mittra's dielectric conformal FDTD technique, the simplified conformal finite integration technique and the Newmark-Beta method.
- The resultant scheme is magnetically implicit and energy conserving, has a relaxed stability condition and allows for accurate modeling of both perfectly electric conducting and dielectric curved surfaces
- A theoretical proof for energy conservation and stability of the scheme with the energy inequality method is presented. A generalization of the scheme is also discussed.
- The scheme is applied to simulate both spoof surface plasmon polaritons and spoof localized surface plasmons.