**Local field distribution near corrugated interfaces: Green function formalism versus effective medium theory** CHUN WING CHOY, JUN JUN XIAO, KIN WAH YU, The Chinese University of Hong Kong — The Green function formalism (GFF) has been established recently [1,2] to study the local field electric field distribution near a periodic interface separating two homogeneous media of different dielectric constants. In GFF, the integral equations can be solved conveniently because of the existence of an analytic expression for the kernel (Greenian). However, due to a severe singularity in the kernel, the formalism was formerly applied to compute the electric fields away from the interface region [1,2]. In this work, we have been succeeded in extending GFF to compute the electric field inside the interface region, by taking advantage of a sum rule. To our surprise, the strengths of the electric fields are quite similar in both media across the interface, despite of the large difference in the dielectric constants. Moreover, we propose a simple effective medium approximation (EMA) to compute the electric field inside the interface region. We show that EMA can indeed give an excellent description of the electric field except near a geometric resonance.

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[2] H. F. Tam and K. W. Yu, Annual APS March Meeting, abstract Q31.009 (2002).

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