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Fioralba Cakoni*, Department of Mathematics, Rutgers University, Busch Campus, 228 Hill Center - 110 Frelinghuysen Road, Piscataway, NJ 08854-8019, and **Houssein Haddar** and **Thi Phong Nguyen**. *Single Floquet-Bloch Mode Imaging of Local Perturbations in Periodic Media*.

This paper considers the imaging of local perturbations of an infinite penetrable periodic layer. A cell of this periodic layer consists of several bounded inhomogeneities situated in a known homogeneous media. We use a differential linear sampling method to reconstruct the support of perturbations without using the Green's function of the periodic layer nor reconstruct the periodic background inhomogeneities. The mathematical justification of this imaging method relies on the well-posedness of a nonstandard interior transmission problem, which until now was an open problem except for the special case when the local perturbation didn't intersect the background inhomogeneities. We show some numerical examples that confirm the theoretical behavior of the differential indicator function determining the reconstructable regions in the periodic layer. (Received September 14, 2018)