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**Dinh-Liem Nguyen\*** (dlnghuyen@umich.edu), Dinh-Liem Nguyen, Department of Mathematics, University of Michigan, 4863 East Hall, 530 Church Street, Ann Arbor, MI 48109. *An inverse electromagnetic scattering problem for the Drude-Born-Fedorov model for chiral gratings.*

We consider the electromagnetic inverse scattering problem for the Drude-Born-Fedorov model for periodic chiral structures known as chiral gratings both in  $\mathbb{R}^2$  and  $\mathbb{R}^3$ . The Factorization method is studied as an analytical as well as a numerical tool for solving this inverse problem. The method constructs a simple criterion for completely characterizing shape of the periodic scatterer which leads to a uniqueness result and a fast imaging algorithm. The required data consists of certain components of Rayleigh sequences of (measured) scattered fields caused by plane incident electromagnetic waves. We propose in this electromagnetic plane wave setting a rigorous analysis for the Factorization method. Numerical examples in two and three dimensions are also presented for showing the efficiency of the method. (Received January 17, 2015)