1019-49-158   **Nathan Albin***, Fachbereich Mathematik, Universitat Duisburg-Essen, Campus Duisburg, Lotharstr. 65, 47057 Duisburg, Germany. *Optimal Multiphase Composites: Navigating the Translation Bound.*

Consider a periodic composite of several electrically conducting materials. The translation bound for this problem limits the possible effective tensors of such a composite. The bound is geometry-independent. It depends only on the properties of the constituent materials and on their relative volume fractions. An interesting question for such composites remains open in the case of three or more constituent materials. Given fixed relative volumes of each material and a tensor satisfying the translation bound, can one find a geometry which produces this effective tensor? We shall discuss new methods for addressing this question and demonstrate their effectiveness. We are able to saturate the translation bound in parameter regimes outside those that were previously known for both two- and three-dimensional composites. The results were obtained in collaboration with Andrej Cherkaev and Vincenzo Nesi. (Received August 14, 2006)