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**Steve Rosencrans\*** ([sir@math.tulane.edu](mailto:sir@math.tulane.edu)), Math Dept/Tulane University, 6823 SAINT CHARLES AVENUE, New Orleans, LA 70118, and **Xuefeng Wang, Bill Winter** and **Shan Zhao**. *Estimates for the principal Dirichlet eigenvalue of anisotropic elliptic operator on a ball and their applications.*

We have developed simple formulas approximating the principal Dirichlet eigenvalue of an anisotropic elliptic operator on a ball. A recent paper of Zhang, Forest, Lipton and Wang provides formulas for the effective electrical (and hence also thermal) conductivity tensor of nematic polymers with nano-inclusions in the form of spheroidal rods or platelets. Combining the two, we can quantify the insulating ability of such nano-materials, in terms of nano-parameters.

We next consider the insulating effectiveness of a thin coating of such a material (by estimating the principal as well as higher Dirichlet eigenvalues of the coated body). (Received September 25, 2006)