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Silvia Jimenez* (sjimenez@math.lsu.edu), 4083 Burbank Dr, Apt. 3, Baton Rouge, LA 70808, and **Robert Lipton**. *Correctors and Field Fluctuations for the $p_\epsilon(x)$ -Laplacian with Rough Exponents*.

Properties of local fields inside mixtures of two nonlinear power law materials are studied. This simple constitutive model is frequently used to describe several phenomena ranging from plasticity to optical nonlinearities in dielectric media. This work addresses a prototypical problem in the scalar setting.

We provide the corrector theory for the strong approximation of fields inside composites made from power law materials. These results are applied to deliver new multiscale tools for bounding the local singularity strength inside micro-structured media in terms of the macroscopic applied fields. (Received September 07, 2009)