Compactness principles and convergence of spectra in double-porosity models.

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We consider the asymptotic behavior of spectra in well-known double-porosity model with dispersive inclusions. Our goals are:

1. To construct the "limit" two-scale operator;
2. To prove that the limit operator has infinitely many gaps in the spectrum;
3. To describe gaps in terms of eigenvalues of two problems on unit inclusion: Dirichlet and electrostatic problems;
4. To prove Hausdorff convergence of the spectra of the initial operator to the spectrum of the limit operator;
5. To prove that the initial operator has gaps, and the number of gaps grows unboundely.