Homogenization of the Poisson equation and Stokes system in some non periodically perforated domains

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We consider the homogenization of the Poisson equation and the Stokes system in non periodically perforated domains. In this setting, the size of the perforations is proportional to the distance between neighbouring cells and scales like $\varepsilon \ll 1$. The behaviour of the solutions of these PDEs is well known when the holes are periodically distributed in the macroscopic domain. We propose to generalize these results when the perforations are locally non periodic but tend to be periodic far from the origin. We study classical objects of the homogenization theory such as two-scale expansions, existence of correctors and we derive convergence rates of the exact solutions towards their homogenized approximations.

We will emphasize on the geometric properties that we impose on the non-periodic perforations and we will present the results obtained in [1, 2].

[1] X. Blanc, S. Wolf. *Homogenization of the Poisson equation in a non periodically perforated domain.* Accepted for publication in Asymptotic Analysis, 2021.

[2] S. Wolf. *Homogenization of the Stokes system in a non periodically perforated domain.* Submitted, 2021.

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