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Journal of Convex Analysis 14 (2007) 205–226

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## **Multiscale Homogenization of Convex Functionals with Discontinuous Integrand**

This article is devoted to obtain the  $\Gamma$ -limit, as  $\varepsilon$  tends to zero, of the family of functionals

$$u \mapsto \int_{\Omega} f\left(x, \frac{x}{\varepsilon}, \dots, \frac{x}{\varepsilon^n}, \nabla u(x)\right) dx,$$

where  $f = f(x, y^1, \dots, y^n, z)$  is periodic in  $y^1, \dots, y^n$ , convex in  $z$  and satisfies a very weak regularity assumption with respect to  $x, y^1, \dots, y^n$ . We approach the problem using the multiscale Young measures.

**Keywords:** convexity, discontinuous integrands, iterated homogenization, periodicity, multiscale convergence, Young measures, Gamma-convergence

**MSC:** 28A20, 35B27, 35B40, 74Q05