

Homogenization of the Navier-Stokes equation towards the Euler-Brinkman-Forchheimer equation"

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We study the behaviour of the solution of the Navier-Stokes equation with vanishing viscosity in \mathbb{R}^3 perforated by very small, periodically distributed holes. In particular, we focus on the case where the local Reynolds number at the scale of the holes is vanishing slowly. We aim to prove a quantitatively better effective model equation than the Euler-Brinkman equation. This new equation, the Euler-Brinkman-Forchheimer equation, includes a quadratic zeroth order term. The proof relies on a relative energy argument and a precise local approximation of the microscopic solution around each hole. This is a joint and ongoing work with Richard Höfer.