

Abstract Submitted  
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**Effects of inhomogeneous partial absorption and the geometry of the boundary on the population evolution of molecules diffusing in general porous media** SEUNGOH RYU, DAVID L. JOHNSON, Schlumberger Doll Research — We consider the diffusion-relaxation dynamics in porous media with partially absorbing boundary conditions. Spectral analysis of Helmholtz equation for the uniform boundary condition has been widely used as a probe of geometry of the medium. The NMR relaxation of the fluid magnetization, for example, is used for a variety of media such as rocks, cement, bones, and cheese. While direct relationship between their geometry and the spectrum forms the basis for such applications, little attention has been paid to the spatial variation of the boundary condition. We report on the way the geometry and such inhomogeneity become intertwined and affect the spectrum. It is often impossible to gauge how severe such interference is in the biological or geophysical experiments. We develop a perturbative theory and numerical techniques and test for cases for which exact solution is obtained.

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