

Abstract Submitted  
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**Probing sub-alveolar length scales with hyperpolarized-gas diffusion NMR**<sup>1</sup> WILSON MILLER, MICHAEL CARL, KAREN MOONEY, JOHN MUGLER, GORDON CATES, University of Virginia — Diffusion MRI of the lung is a promising technique for detecting alterations of normal lung microstructure in diseases such as emphysema. The length scale being probed using this technique is related to the time scale over which the helium-3 or xenon-129 diffusion is observed. We have developed new MR pulse sequence methods for making diffusivity measurements at sub-millisecond diffusion times, allowing one to probe smaller length scales than previously possible in-vivo, and opening the possibility of making quantitative measurements of the ratio of surface area to volume (S/V) in the lung airspaces. The quantitative accuracy of simulated and experimental measurements in microstructure phantoms will be discussed, and preliminary in-vivo results will be presented.

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