

Abstract Submitted
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Physics and the Lung RICHARD JACOB, KEVIN MINARD, Pacific Northwest National Laboratory — Lungs are complex, dynamic organs whose primary purpose is gas exchange. Various physics principles are critical to understanding lung function, and an application of physics can help elucidate how different diseases affect the lungs' ability to move air and exchange gas. Recent advances in gas-phase magnetic resonance imaging (MRI) allow for gas dynamics to be quantified non-invasively. Gas flow velocity in the major airways and diffusion (Brownian motion) in the deep lung can be quantified in vivo in three dimensions with MRI. Application of these techniques may facilitate improved disease diagnosis and patient-specific therapeutic interventions. In this presentation a brief overview of basic lung physics will be given and our recent use of in vivo hyperpolarized ^3He MRI for visualizing gas transport in healthy and diseased rat lungs will be summarized.

Richard Jacob
Pacific Northwest National Laboratory

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