

Abstract Submitted  
for the NWS06 Meeting of  
The American Physical Society

**Quantitative Magnetic Resonance Imaging of He-3 Gas Transport**

RICHARD JACOB, KEVIN MINARD, Pacific Northwest National Lab, Richland, WA 99352 — Magnetic resonance (MR) imaging has long been used to quantify fluid flow, a technique that has widespread medical use in angiography. Gas flow imaging in pulmonary airways, however, is much more challenging, because of low MR signals received from conventional gases and because of the high diffusivity of gases. Here, we show the feasibility of quantifying gas flow in major airways of adult rats by using hyperpolarized He-3 flowing through a straight tube at physiological flow rates. Measured maps of axial flow and diffusion are accurately predicted using a simple transport model that describes the statistical dynamics of He-3. Since the model is generally applicable to any flow conduit, results provide a basis for gas transport studies with noninvasive He-3 MRI.

Richard Jacob  
Pacific Northwest National Lab, Richland, WA 99352

Date submitted: 10 Apr 2006

Electronic form version 1.4