

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

A new concept of concomitant field free, low-field SQUID MRI.¹
BYEONG HO EOM, KONSTANTIN PENANEN, INSEOB HAHN, Jet Propulsion
Laboratory/California Institute of Technology — We report a new MRI concept
using a magnetic field configuration that eliminates the concomitant field effect,
especially for low-field MRI. In low field MRI, the image acquisition time and/or the
image resolution are constrained by small image encoding magnetic field gradients.
Image encoding gradients always entail the undesirable concomitant fields according
to the Maxwell equations. These fields are necessarily proportional to the encoding
gradients, and result in various image artifacts. To reduce or correct the artifacts,
the gradients should be small so that the magnetic field variation in field of view is
a small fraction of the static homogeneous field. We obtained a field configuration
such that the magnitude of the field changes monotonically along one direction by
removing the constraint of uniaxial spin precession and linearity of field gradients.
This field configuration is used to encode projections and the image is obtained from
back projection reconstruction. A current configuration was obtained to produce this
field configuration. An implementation design is proposed based on expanding the
field and current configuration in terms of harmonics.

¹This work is supported by NASA

Inseob Hahn
Jet Propulsion Laboratory/California Institute of Technology

Date submitted: 06 Dec 2006

Electronic form version 1.4