

**Gradient tones and NMR field probes
for prospective motion
correction and concurrent field monitoring**

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Inserting sinusoidal high frequency gradient oscillations ("tones") into spare bands of existing sequence gradient waveforms enables synchronous field probe localization and image encoding. Relying on narrow band signal in the kilohertz range, the field probe localization is very robust against common field imperfections occurring at low frequencies, such as main field drifts and physiologically induced field perturbations. Combining tones with a head-mounted field probe array enables prospective rigid body motion correction in vivo. Moreover, the field probe array can be readily used for concurrent field monitoring in the head frame of reference for accurate image reconstruction in the presence of dynamic field perturbations. This presentation gives an introduction to the tones concepts, with an emphasis on system calibration. It discusses the challenges of combined motion tracking and field monitoring and the most recent technological developments.