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Transverse coherence in rapid FLASH NMR imaging

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Abstract

FLASH (*f*ast *l*ow-angle *s*hot) imaging is a rapid NMR imaging technique using radiofrequency pulses with flip angles of less than 90° and detection of the FID signal in the form of a gradient-recalled echo. Although *in vivo* applications of the sequence basically rely on a steady state of the longitudinal magnetization, tissues with long spin-spin relaxation times T_2 may lead to the establishment of a steady-state transverse magnetization: residual transverse magnetizations at the end of the repetition interval are transformed into a SSFP-like signal by subsequent rf pulses. Interference of these transverse coherences with the FID or gradient echo leads to image artifacts. Here we propose two modifications of the basic FLASH sequence that either eliminate (‘‘spoil’’) or include (‘‘refocus’’) the effects of transverse coherences in rapid images. Experiments have been carried out on phantoms using a 2.35 T 40 cm magnet (Broker Medspec) and on healthy volunteers using a 1.5 T whole-body system (Siemens Magnetom).



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Effect of coal type on the flash pyrolysis of various coals, the channel of a temporary watercourse attracts a minimum.

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