Title: IMPROVED MOTION-SENSITIZED DRIVEN EQUILIBRIUM BLOOD-SUPPRESSION SEQUENCE FOR VESSEL WALL IMAGING

Abstract: An improved motion-sensitization driven equilibrium (MSDE) sequence based upon an MLEV-4 sequence is used for black-blood vessel wall imaging. The MSDE pulse pattern that is used as a preparation sequence for other procedures employed to acquire images has been modified to produce the MSDE sequence by the addition of a second 180 degree refocusing pulse and two motion sensitization gradients. The MSDE sequence thus includes a group of four radio frequency (RF) pulses, as well as additional magnetic gradient pulses that are not included in the conventional MSDE sequence. Computer simulations indicate that this new pulse sequence is substantially more immune to local B1 inhomogeneity than conventional sequences. In vivo experiments have demonstrated significant signal improvement at high first-order moments (m₁) conditions compared to the traditional MSDE sequence.

FIG. 1A
**INTERNATIONAL SEARCH REPORT**

**International application No.**

PCT/US2009/034686

**A. CLASSIFICATION OF SUBJECT MATTER**

A61B 5/055(2006.01)i, A61B 5/02(2006.01)i, G05F 1/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 8 : A61B, G05F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models since 1975.

Japanese utility models and applications for utility models since 1975.

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & keywords: "MRI", "MSDE", "RF", "pulse" and "sensitization"

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
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<tbody>
<tr>
<td>Y A</td>
<td>WANG, J. et al. 'A turbo spin-echo (TSE) based motion-sensitized driven-equilibrium (MSDE) sequence is used as an alternative black-blood (BB) carotid MR imaging scheme.' Magnetic Resonance in Medicine, 2007, Vol. 58(5), pp. 973-981. See abstract, figure 1.</td>
<td>1-3, 10-13, 4-9, 14-25</td>
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<td>A</td>
<td>US 5,285,158 A (MISTRETTA, C. A.) 8 February 1994 See abstract, claims 1-8, and figures 1-5.</td>
<td>1-25</td>
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</tbody>
</table>

☐ Further documents are listed in the continuation of Box C.  See patent family annex.

* Special categories of cited documents:
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Date of the actual completion of the international search

30 SEPTEMBER 2009 (30.09.2009)

Date of mailing of the international search report

30 SEPTEMBER 2009 (30.09.2009)

Name and mailing address of the ISA/KR

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### INTERNATIONAL SEARCH REPORT

**Information on patent family members**

<table>
<thead>
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