TECHNOLOGY OFFER

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MAGNETIC GRADIENT SENSOR

The invention concerns a sensor for the magnetic field gradient and applies micromechanical structures. Lorentz-forces excite these structures whereas the vibrational modes are excited by the respective components of the magnetic gradient. This allows highly selective measurements of the respective gradient components. The invention was made by researchers of the Vienna University of Technology.

BACKGROUND

Magnetic fields are typically measured by Hall-sensors which suffer from a large offset and offset drift. For the measurement of a magnetic gradient the difference of the signal of two sensors has to be formed. Especially at higher magnetic fields this difference causes huge errors due to the inevitable variations of the sensor parameters. This is a fundamental drawback of all such measurements based on two sensors.

TECHNOLOGY

The proposed structure comprises a single micromechanical structure (Fig. 1) which exhibits different mechanical vibration modes. The electrical current on the leads of the structure and magnetic fields generate Lorentz-forces excite specific vibration modes. By measuring the amplitude of the vibrations one can calculate specific components of the magnetic field and the components of the gradient. The structure is fabricated with silicon technology, the typical method for micromechanical systems. This highly advanced technology allows well defined and, consequently, highly precise dimensions and measurements.
The sensor is based on a single structure and does therefore not suffer from the disadvantages associated with two single sensor elements.

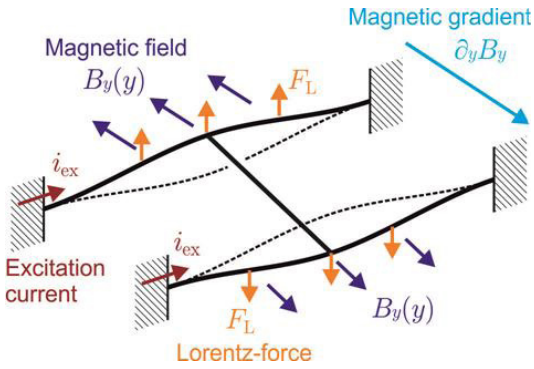

Fig 1: Working principle of the magnetic gradient sensor.

ADVANTAGES

- Highly selective for single components of the magnetic field
- Highly selective for single components of the magnetic gradient
- Low offset principle
- Highly linear and dynamic

REFERENCE:
M030/2013

APPLICATIONS:
- Magnetic resonance imaging equipment with enhanced resolution.
- Characterization of high magnetic fields
- Oil prospection
- Position sensing with magnetic elements
- Angular measurement with permanent magnets

DEVELOPMENT STATUS:
Labor prototype

KEYWORDS:
magnetic gradient sensor, micromechanical structure

IPR:
Patent granted in AT (AT 515 000); CH, DE, FR, and GB (see EP 3 060 933)

OPTIONS:
- R&D - Cooperation
- License Agreement
- Patent sale

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