

Imaging with microfabricated atomic magnetometer arrays

Svenja Knappe

Paul M. Rady Department of Mechanical Engineering, University of Colorado Boulder,
Boulder CO 80309, USA

FieldLine Medical, Boulder CO 80301, USA

FieldLine Industries, Boulder CO 80301, USA

Atomic hot-vapor magnetometers are not a new technology, yet there has been a surge in research activities in the field over the past 30 years. This was fueled by the combination of their high sensitivity and compact size. Microfabrication has played a crucial role in translating the technology to commercially-viable products. This talk will present our progress towards several imaging applications shown in Figure 1. They include a compact vector-scalar magnetometer as a payload for a constellation of CubeSats. Here, accuracy and long-term stability, as well as robustness and power consumption are driving factors for the development. For biomedical applications such as magnetoencephalography (MEG), low noise floor, linearity, small size, and low cost are important, and MEG arrays based on hot-vapor magnetometers include over 100 sensors. Finally, for a magnetographic camera, small pixel size, small standoff, and low noise floor are driving specifications.

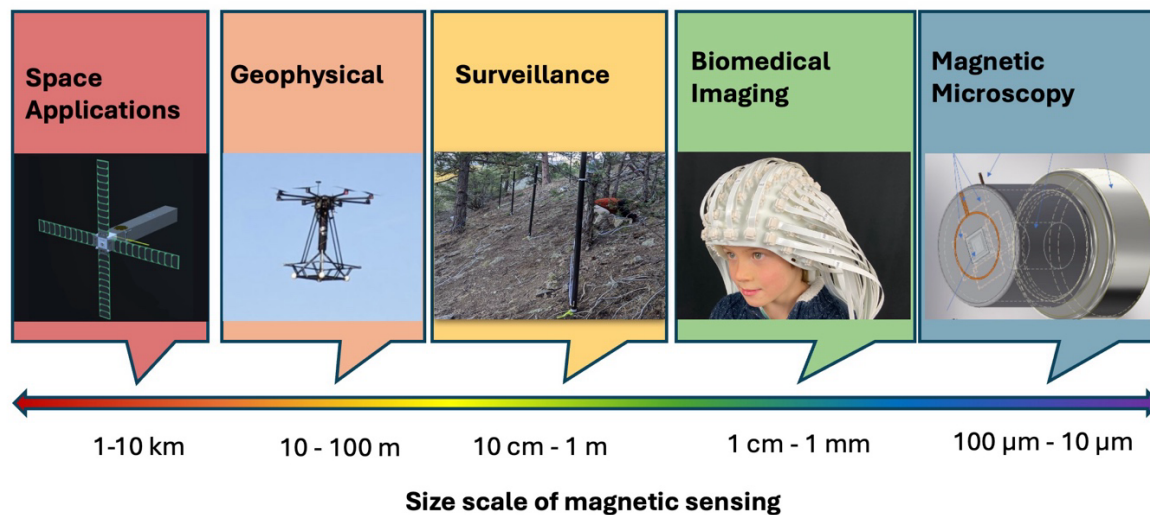


Figure 1: A selection of Magnetic Imaging applications for microfabricated atomic magnetometer arrays.