

Abstract

Compliant Magnetic Sensor Technologies †

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Abstract: We will review the recent progress in the field of shapeable magnetoelectronics allowing to realize not only mechanically imperceptible electronic skins, which enable perception of the geomagnetic field (e-skin compasses), but also enable sensitivities down to ultra-small fields of sub-50 nT. We demonstrate that e-skin compasses allow humans to orient with respect to earth's magnetic field ubiquitously. The biomagnetic orientation enables novel interactive devices for virtual and augmented reality applications, which is showcased by realizing touchless control of virtual units in a game engine using omnidirectional magnetosensitive skins. This concept was further extended by demonstrating a compliant magnetic microelectromechanical platform (m-MEMS), which is able to transduce both tactile (via mechanical pressure) and touchless (via magnetic field) stimulations simultaneously and discriminate them in real time. Those devices are crucial for interactive electronics, human-machine interfaces, but also for the realization of smart soft robotics with highly compliant integrated feedback system as well as in medicine for physicians and surgeons.

Keywords: flexible electronics; stretchable electronics; magnetic field sensors