

Abstract

Compliant Magnetic Field Sensor Technologies [†]

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Abstract: We review the recent progress in the field of shapeable magnetoelectronics allowing the realization of mechanically imperceptible electronic skins, which enable perception of the geomagnetic field (e-skin compasses), featuring 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 is 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. These devices are crucial for interactive electronics and human-machine interfaces, but also for the realization of smart soft robotics with highly compliant integrated feedback systems including in medicine for physicians and surgeons.

Keywords: flexible electronics; stretchable electronics; magnetic field sensors



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