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Poster title: Human Motion Perception Utilizes an RF-Sensitive Geomagnetic Compass Sense

Abstract: Prior work by Wang et al. (2019) showed that rotating Earth-strength magnetic fields suppress alpha activity in the human brain, suggesting a polarity-sensitive geomagnetic sensory pathway, though its behavioral relevance remained unclear because humans lack conscious awareness of magnetic cues. Here, we show that geomagnetic information influences visual motion perception. Participants viewed random-dot kinematograms (RDKs) under rotating versus static magnetic field conditions. After training at 60% coherence, they completed 0% coherence trials with no visual motion signal. Participants exhibited a systematic bias, perceiving motion opposite to the direction of magnetic field rotation, indicating that geomagnetic input serves as a reference frame when visual information is degraded. Introducing a weak 40 MHz RF signal (<10 nT) abolished this effect, consistent with findings that RF disrupts magnetoreception in animals. Together, these results suggest that the human brain retains a functional geomagnetic compass, similar to those observed in migratory and homing animals, that is sensitive to radiowave interference.