



EMF and WiFi Q&A

During the webinar, the following question was asked in the Q&A section. Please email info@radiationsafety.ca if you wish to discuss this further or any have any other follow up question arising from the presentation.

Q: The part about energy levels effecting the inner ear of people, could you clarify please?

A: The effect presented is the feeling of vertigo and nausea by some when in the presence of static magnetic fields of strengths of 2 – 3 T or more, as might be found near an MRI machine. In their paper, [A Decade of Magnetic Vestibular Stimulation: from Serendipity to Physics to the Clinic](#)¹, Ward et al. state that [previous research suggests...] ... a possible mechanism: a Lorentz force occurring in the labyrinth from the interactions of normal inner ear ionic currents and the strong static magnetic fields of the MRI machine. Inside an MRI, the Lorentz force acts to induce a constant deflection of the semicircular canal cupula of the superior and lateral semicircular canals. This inner ear stimulation creates a sensation of rotation[.]

The Lorentz force is the force on a charged particle as a result of moving through an electromagnetic field. The labyrinth, semicircular canal cupula, and the superior and lateral semicircular canals are structures in the inner ear involved in balance. Basically, the presence of a strong magnetic field pushes the liquid in the inner ear against sensors which detect which way you head is positioned, giving an incorrect reading. What you see and what you feel does not match, so it gives the sensation of vertigo.

¹ Ward, B. K., Roberts, D. C., Otero-Millan, J., & Zee, D. S. (2019). A decade of Magnetic Vestibular stimulation: From serendipity to physics to the clinic. *Journal of Neurophysiology*, 121(6), 2013-2019. doi:10.1152/jn.00873.2018