Earth as a transducer for ultralight dark-matter detection

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based on arXiv:2106.00022, arXiv:2108.08852, arXiv:2112.09620

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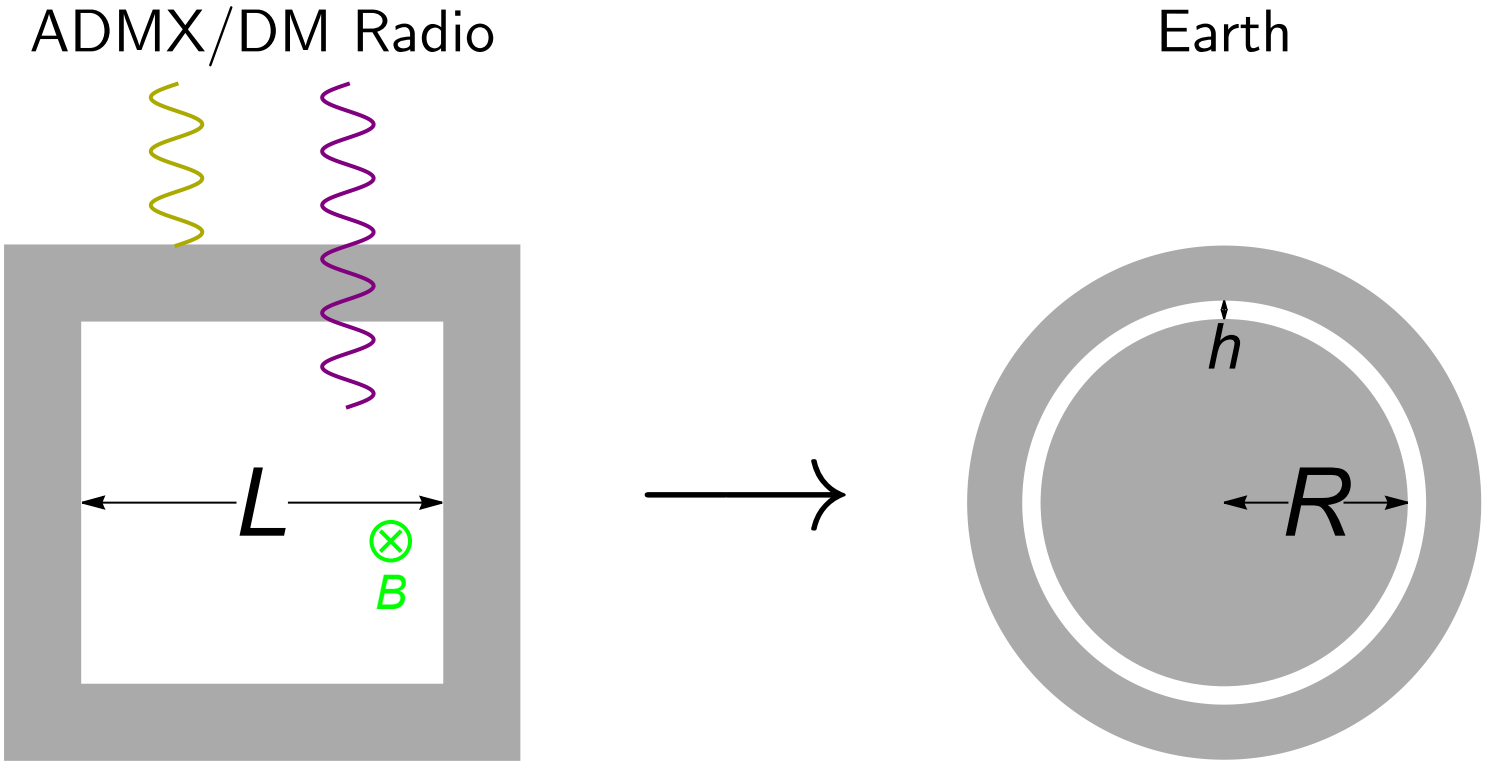
Introduction



Scales with L

Scales with R, not h!

Signal Properties

- Magnetic field at Earth's surface
- Large: scales with R not h
- Spatially coherent: particular global spatial pattern
- Temporally coherent: sharply peaked in frequency with $Q \sim 10^6$
- Robust: relevant component of signal is unaffected to leading order by boundary conditions!
- Detectable: searched existing SuperMAG geomagnetic field dataset to set bounds on dark-photon and axion parameter space