

# Electromagnetic Waves Confined in Annular Regions

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Electrodynamics configurations are obtained by solving the classical wave equations for the electric and the magnetic fields, in domains where the multiplicity of a given eigenvalue of the vector Laplacian is equal to four. This allows for the determination of interesting periodic solutions. The analysis is carried out in annular domains, and requires the determination of appropriate combinations of Bessel's functions and other special functions. Possible applications are in the field of plasma physics. In particular, we show how entrapped waves circulating in annular cavities may explain the stability properties of the phenomenon known as *ball lightning* [1].

## References

- [1] D. Funaro, Ball lightning as plasma vortexes: A reinforcement of the conjecture, Applied Sciences, MDPI, 12-7 (2022), 3451.