

**ZMATH 2009a.00477**

**Burko, Lior M.**

**Transversality of electromagnetic waves in the calculus-based introductory physics course.**

Eur. J. Phys. 29, No. 6, 1223-1234 (2008).

Summary: Introductory calculus-based physics textbooks state that electromagnetic waves are transverse and list many of their properties, but most such textbooks do not bring forth arguments why this is so. Both physical and theoretical arguments are at a level appropriate for students of courses based on such books, and could be readily used by instructors of such courses. Here, we discuss two physical arguments (based on polarization experiments and on lack of monopole electromagnetic radiation) and the full argument for the transversality of (plane) electromagnetic waves based on the integral Maxwell equations. We also show, at a level appropriate for the introductory course, why the electric and magnetic fields in a wave are in phase and the relation of their magnitudes.

*Classification:* M65

doi:10.1088/0143-0807/29/6/011