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Under what conditions do accelerating charges radiate? An examination of recent literature EDWARD BUTTERWORTH, PAUL COX, Texas A&M University-Kingsville — The process by which accelerated charges emit electromagnetic radiation remains surprisingly obscure: even at the advanced level, most textbooks do not treat it in detail, and published reports show a wide variety of descriptions of the process, some of which have led to paradoxes. Three situations receive particular attention in the literature: a static charge in a gravitational field, a uniformly accelerated charge and a charge in uniform circular motion. Some of the paradoxes reported may relate to terminological confusion: Shariati & Khorami (1999) identify three distinct ways in which the word “radiation” is commonly used. Against published claims that uniformly accelerated charges do not radiate, Boulware (1980) and de Almeida & Suu (2006) propose that they do, but into a region of spacetime inaccessible to a comoving observer. Piazzese (2003) obtains the result that charges in uniform circular motion do not radiate, subject to particular constraints that limit orbital size; with the result that electrons in Bohr orbits do not radiate, while synchrotron radiation is allowed. The present paper provides an overview of the body of literature on this topic, and identifies several significant themes that seem appropriate for further development.

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