

Abstract Submitted
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Electromagnetic Emissions Induced by Small Meteoroids¹ YAKOV DIMANT, MEERS OPPENHEIM, Boston University, GLENN SUGAR, Stanford University — Meteor fireballs produce strong electromagnetic (EM) pulses that result in audible sounds called electrophonics. These big fireballs, however, are rare phenomena, while much more frequent small, submilligram and submillimeter, meteoroids constantly bombard the Earth, depositing tons of extraterrestrial material in its atmosphere. Recent ground-based antenna observations during meteor storms have demonstrated that small meteoroids can also produce detectable electromagnetic pulses. Naturally produced EM emission could serve as a complementary diagnostics of meteor-related phenomena. These observations, however, are not free of controversy, so that it is important to understand whether detectable EM emission caused by small meteoroids may really follow from a first-principle theory of meteor plasma. To this end we need to understand and quantify the physical nature and dispersive properties of the EM emissions. Based on our recent analytic theory and simulations of the meteor plasma, we have analyzed possible kinds of EM emissions that may originate from meteor plasma. We will present the outcome of this analysis and its implications for radar observations and meteor diagnostics.

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