

Abstract Submitted
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Ballistic dynamics of a relativistic electron beam for mapping of the magnetosphere¹ MICHAEL GREKLEK-MCKEON, Princeton Plasma Physics Laboratory, ANDREW T. POWIS, Princeton University, IGOR D. KAGANOVICH, PETER PORAZIK, Princeton Plasma Physics Laboratory, JAY JOHNSON, JAKE WILLARD, Andrews University, ENNIO SANCHEZ, SRI International — Relativistic electrons fired from an orbiting satellite will propagate along the field lines of the magnetosphere. When the electrons impact the Earth's atmosphere, they produce a characteristic signature that is detectable by ground stations. Such a diagnostic would enable direct validation of magnetospheric models, and assist in answering outstanding questions on auroral arcs. We determine the loss cone of a relativistic electron beam at various injection points within the Earth's magnetosphere during the stages of a prominent geomagnetic event. We then study the degree of beam spreading during propagation to determine the viability of signal detection at the top of the atmosphere. This verification, using realistic magnetic field data, demonstrates that an electron beam emitted from a satellite can be fired into the loss cone of the Earth's atmosphere and create an observable signal on the ground.

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