Eikonal approximation in electromagnetic scattering[1] AVINASH
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Southern Illinois University Carbondale — Eikonal approximation, which uses the
intuition of geometrical optics, has been used in high energy scattering theories for
more than a hundred years. More recently, eikonal approximation has been used in
quantum mechanics in the form of WKB approximation, although it originated in
the field of electromagnetism and optics. In this work, we revisit eikonal approx-
imation in the context of electromagnetic scattering. We study the scattering of
a monochromatic electromagnetic wave off a weak dielectric sphere in the eikonal
approximation. Scattering of a monochromatic electromagnetic wave off a weak di-
electric sphere can also be solved exactly. We use the Green function formalism to
exactly solve the scattering cross section for our electromagnetic configuration using
partial wave method. We numerically solve and compare the scattering cross section
obtained using eikonal approximation with the partial wave method. We expect our
work to shed some light on the regime of validity of eikonal approximation.

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