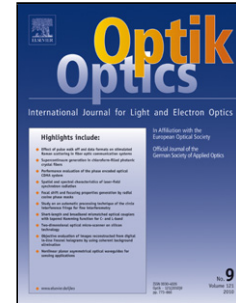


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4 **Fractional dual fields to the Maxwell equations for a line source buried**  
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6 **in dielectric half space**

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8 By

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23 **Abstract**

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26 Fractional dual solutions to the Maxwell equations for a line source carrying time  
27 harmonic current and buried in planar dielectric half space geometry have been derived.  
28 Fractional dual solutions may be regarded as intermediate step between the two given  
29 canonical cases which are connected through the principle of duality. Original case is  
30 an electric line source buried in dielectric half space and dual to the original case is  
31 a magnetic line source buried in dielectric half space. For fractional dual situations,  
32 impedance of the interface separating the two half spaces has also been determined.  
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42 **1. Introduction**

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45 Two decades before, Prof. Engheta from University of Pennsylvania, USA, initi-  
46 ated work on finding the roles and applications of tools of fractional calculus, a branch  
47 of mathematics, in the subject area of electromagnetics [1-6]. Classically, the subject  
48 fractional calculus contains fractional order derivative and fractional order integral as  
49 the only two tools with variety of definitions given in scientific literature [7-8]. The  
50 order of two fractional operators can be real/complex. Engheta utilized the tools of  
51 fractional calculus in a number of research problems and the results revealed that  
52 tools of fractional calculus can be useful in describing certain phenomenon/behaviors  
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