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# Electromagnetic Scattering from Cylinders of Infinite Length Immersed in a Complex Conjugate Medium

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**Abstract:** Electromagnetic wave scattering from cylinders of different materials immersed in complex conjugate medium (CCM) is studied. CCM is a non-dissipative medium through which electromagnetic wave can travel without attenuation. Lengths of cylinders are infinite and CCM is also taken as infinite. Chiral, perfect electromagnetic conductor (PEMC), nihility and dielectric cylinders have been considered for the analysis. TM polarization is considered for the normally incident plane wave on the cylinder. Scattered fields are then formulated in terms of unknown coefficients. It is a boundary value problem. Boundary conditions are used according to the material of the cylinder to find the unknown coefficients. Once the scattered fields are known, far fields approximations are used to find the scattering widths for the co and cross polarized components. Numerical results are shown to give a comparison between the cylinders of different materials immersed in the same material. Comparison of work found in good agreement with already published work.

Keywords: Electromagnetic Waves, Complex Conjugate Medium (Ccm), Metamaterials, Coated Cylinders

*INDEX TERMS—ELECTROMAGNETIC WAVES, COMPLEX CONJUGATE MEDIUM (CCM), METAMATERIALS, COATED CYLINDERS*

## 1. INTRODUCTION

Different types of cylinders, which includes dielectric, conducting, chiral, nihility, Metamaterials and buried cylinders were analyzed by different researchers in past. Buried cylinders are used to detect mines and

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