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# WHITE PAPERS
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WHITEPAPER

OPTICAL MATERIALS IN CST STUDIO SUITE

*For many optical applications, materials are needed with anisotropic or nonlinear properties. Two important examples of such properties are birefringence and dichroism. Such materials exhibit different refractive indices and attenuation for orthogonal optical polarization states. They are used to alter the polarization state of the light for example in polarizers or polarization converters. A special case of a polarization dependent material property is magneto-optical activity. Magneto-optical active materials can also be used to alter the polarization state, but more importantly they can be used to build non-reciprocal components like isolators. Further, the optical properties can not only depend on the state of polarization but also on the electric field amplitude of the light wave. The optical properties can depend on the second, third power or even higher powers of the electric field. Here, the effects and applications are vast – amplification, frequency conversion, and all-optical switching to name but a few.*

## Optical Materials in CST STUDIO SUITE

This paper demonstrates the electromagnetic simulation of optical materials and explains how anisotropic and nonlinear material properties can be modeled virtually. Topics covered include birefringence, dichroism, magneto-optical activity and Kerr media. Using these material models, engineers can design and simulate photonic devices digitally, allowing them to analyze and optimize the performance of photonic systems before committing to manufacturing.

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