

# **Non-linear processes in dyes and nematic photo-elasticity**

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## **Abstract**

Linear optical absorption of light in simple dyes gives rise to Beer's Law penetration. Often intense light appears to penetrate much more deeply than expected, presumably due to non-linear processes associated with bleaching. Probably bleaching is also responsible for some of the mysteries that arise in the photo-mechanics of nematic elastomers. We describe nematic photo-mechanics and then extend the theory of linear absorption to the non-linear case, both for statics and dynamics. The use of more complicated polarisations of light and of polydomain nematics is also discussed.