

Eureka! : Optical Materials

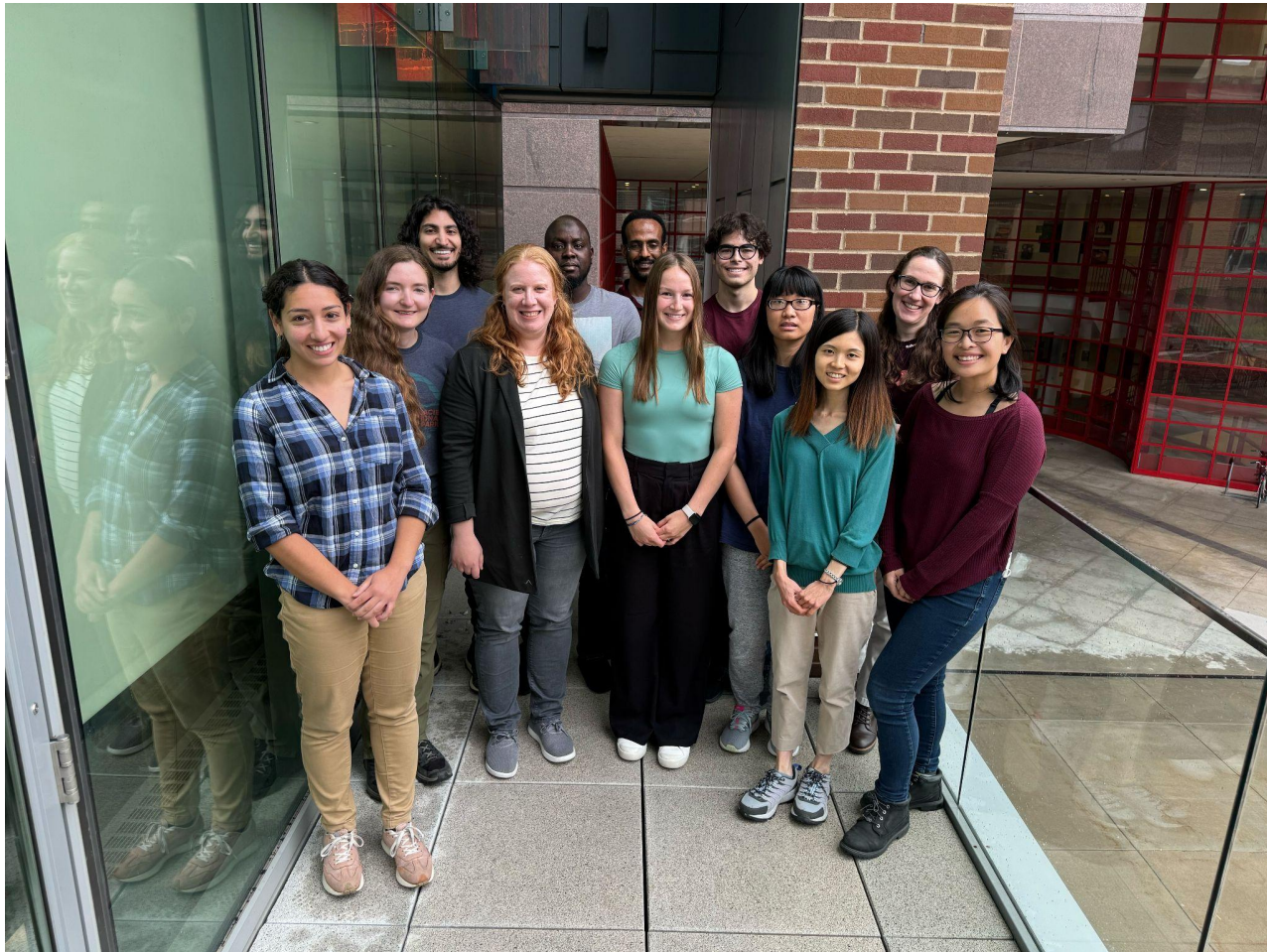
Materials Science and Engineering

July 9, 2024

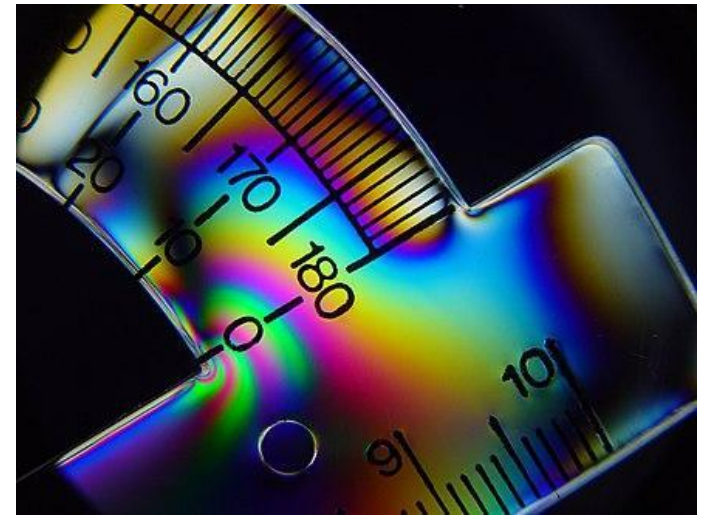


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Who We Are: the Ferry Group!

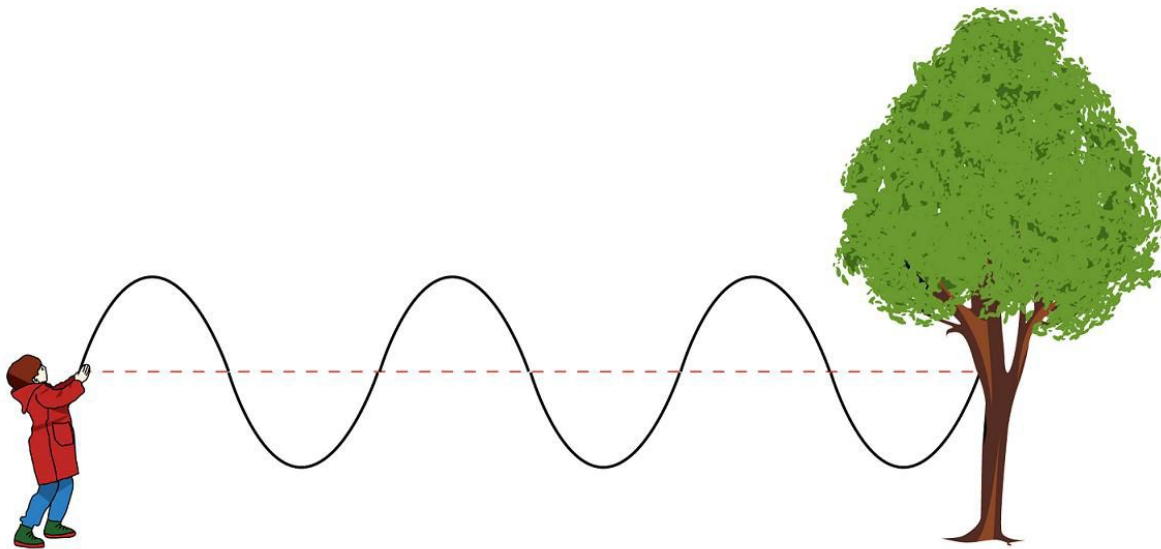


What is polarized light used for?



What is polarized light?

If you shake the end of a rope you can make **waves**.

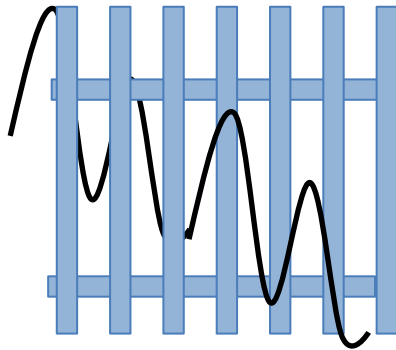


You can make up-and-down waves like in the picture - or you can make sideways waves or make the waves vibrate in any direction.

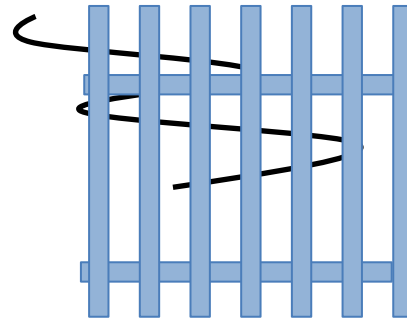


What is polarized light?

Now imagine the waving rope goes between the slats of a picket fence. If the slats are up and down, only the up and down waves can pass through.



Up and down waves get through.



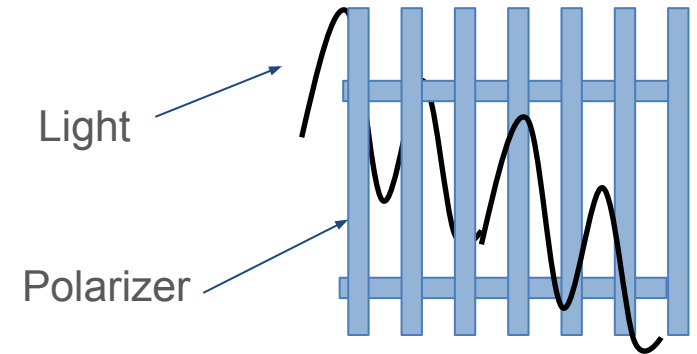
Sideways waves are stopped.

Polarized light has light waves that vibrate all in the same direction. The polarizer is like a picket fence that only allows one direction of vibrating waves to pass through.



Activity!

Predict what would happen if you look through TWO polarizers, holding one still while rotating the other one.



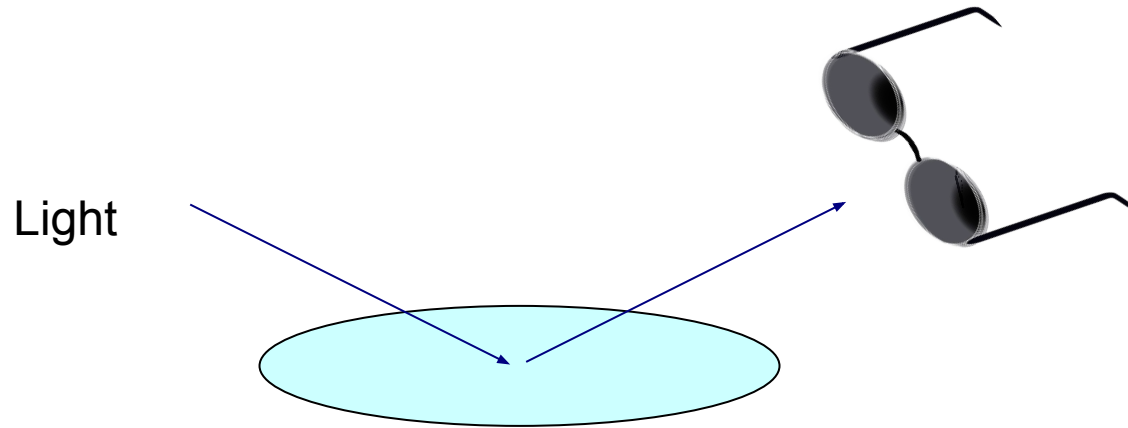
You need a partner for this experiment. Each of you should hold a polarizer in front of your eye.

Tell your partner to hold their polarizer steady without moving it.

Slowly rotate your polarizer as you look through it at your partner's eye. What do you see? Compare your observation with your prediction.



How do polarized sunglasses work?



Sunlight has equal amounts of vertical and horizontally polarized light. But more of the horizontal component is reflected by the surface. Polarized sunglasses can block that component selectively, reducing glare!

<http://www.polarization.com/water/water.html>



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What else can we do with polarized light?



Polarized light can be used to visualize plastic materials under stress, and predict where they will fail.



Today's Activity: Polarized Light Art

Can you use polarization to make art from clear tape? We will stick pieces of tape to clear plastic. Experiment using different layers of tape, and put the tape so that it goes in different directions!

