Studying anisotropy with wood and microwaves

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Nowadays we are confronting with an important decrease in students' motivation for studying physics. It is believed, that topics related to everyday experiences and/or topics, where research is still active may increase the motivation. Liquid crystals are one of the modern materials. They are present everywhere around us and that makes them so interesting. But it is not easy to teach liquid crystals. An important property of liquid crystals is anisotropy (e.g. in refractive index). Wood has strong anisotropic dielectric properties in the microwave range, like liquid crystals in the visible range. A piece of wood can be used for interesting microwave experiments demonstrating optical anisotropy. Selection of microwaves and wood in comparison to liquid crystals and visible light, is useful, because it is easier to work with microwaves due to their wavelength and because wood has pronounced an easily observable anisotropic structure.

Using analogies during the teaching process is one way for students' better visualization and analogy between wood and liquid crystals will be described in the contribution. The set of experiments for more illustrative explanation of the anisotropic properties will be presented. The consequences of anisotropy (e.g. birefringence) will be demonstrated by using a simple school microwave kit and a piece of wood. These experiments are also used for presenting macroscopic properties of liquid crystals by the wood model.

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