

## The Farady effect

### Preparatory Questions

1. What is a polarizer? How does it work?
2. Briefly describe the physical origin of the Faraday rotation.
3. Materials which exhibit natural optical activity (plane of polarization rotates with no magnetic field), the rotation of the plane of polarization reverses when the propagation direction of the light is reversed, i.e., the light exactly retraces its path if reflected back through the material. Natural optical activity results from a helix-like structure in the material, and this structure has the same handedness independent of which direction you look at it. It is like a nut on a screw| the nut rotates one way to move one direction along the screw, and rotates the opposite way to move in the other direction.  
Briefly discuss how this is different from the Faraday effect.
4. In many optics setups (e.g. Michelson and Fabry-Perot interferometers) the desired beam alignment often requires that the light reflect back on itself. A beam reflecting back into a laser can adversely affect the laser operation, and in some situations it is necessary to prevent this from occurring. How can you use the Faraday effect to construct a device that passes light in one direction only? Such a one-way light valve is called an isolator.