

Faraday effect current sensor

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Abstrak

An unpolarized light beam will change to a linear polarized beam by using a polarizing filter. In turn the linear polarized beam can be rotated in an active medium such as glass if a magnetic field exists. This phenomenon, which is known as Faraday effect, is there for can used as a current sensor. In this experiment, the current to be measured was flowed in Helmholtz coils where a homogeneous magnetic field was generated. Bismuth and Flumbo alloys were used as glass medium. An analyzer detected the linear polarized beam came from the glass. The analyzer was adjustable and has a capability to detect a light signal up to 1 mill radian per degree. The values of the rotation of the polarized light beams in the active medium were determined by Verdet's constant. The characteristics of the glasses were represented by plotted curves of rotation angle versus the wavelengths of the light beam, which shows parabolic form. The sensing current by Faraday effect shows a linear feature of rotation angle with respects to the current value, as predicted by the theory. The result also shows that the glass of Bismuth alloy is more sensitive than the Plumbo alloy.