Mechanical and Electromagnetic Forces

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Abstract:

The purpose of this paper is to review the elastodynamical interactions in magneto-micropolar thermoelastic half-space considering the effect of hall current, laser heat source and rotation subjected to input ultra-laser heat source. The micropolar theory of thermoelasticity by Eringen (1966) has been wont to investigate the problem. Normal mode analysis technique has been wont to solve the resulting non–dimensional coupled field equations to get displacement, stress components and temperature distribution. Numerical computed results of all the considered variables are shown graphically to depict the combined effect of hall current, laser heat source and rotation on the phenomena. Some particular cases of interest also are deduced from this study.

Keywords: **Physics, scientific community and society.**

INTRODUCTION

The theory of magneto thermoelasticity features a wide selection of applications and possibilities of research within the field of geology, earth sciences, physics and engineering. When a particle is stationary under the effect of magnetic field, the sector has no effect on this particle. Also, consider a particle is occupation parallel direction of the magnetic flux , the particle will move undeflected. Now just in case a particle is occupation path having a component normal to magnetic flux , the particle are going to be deflected thanks to a force working on it. additionally to the present deflected motion this particle will experiences the electrical field. The combined force is Lorentz force . there's a consideration that mechanical and electromagnetic fields interactions happen thanks to Lorentz forces. Conductivity perpendicular to the direction of magnetic flux is decreased thanks to the free spiraling of negatively charged electrons and other ions about the magnetic flux lines before colliding and a current is induced perpendicular to field and magnetic fields both. This phenomenon is named the Hall Effect. When the magnetic field intensity is extremely high Hall Effect can't be neglected. Zakaria [2] investigated the consequences of Hall current and rotation on magneto micropolar generalized thermoelasticity including the condition with a source of ramp type heating.

Research scientists might rationalize the tension between the intellectual motivation for fundamental research and the arguments (let alone the paperwork) used to justify its funding because the price of doing business, except for many it still brings up a deeper sense of discomfort: the frustration of getting to elucidate something that one considers self-evident (broadly speaking, that investing in fundamental research is sweet for society) to a listener that is either sceptical or, worse, just doesn't see it. In its most naïve form, this comes across as a way of entitlement. And unsurprisingly, when that happens it's thoroughly unproductive: a public that's disengaged from its scientific enterprise is unlikely to back it when it matters — especially when it requires investment to the tune of billions, as is that the case for the foremost important and most ambitious physics projects. It is therefore instructive to need a stepback and examine the difficulty from a special perspective. The electromagnetic force is a type of physical interaction that occurs between electrically charged particles. It acts between charged particles and is the combination of all magnetic and electrical forces. The electromagnetic force can be attractive or repulsive.

Before the invention of electromagnetism, people or scientists used to think electricity and magnetism are two different topics. The view has changed after James Clerk Maxwell published A Treatise on Electricity and Magnetism in the year 1873. The publication states that the interaction of positive and negative charges are mediated by one force. This observation laid a foundation for Electromagnetism. Later many scientists like Michael Faraday, Oliver Heaviside, and Heinrich Hertz contributed their ideas in electromagnetism. We have seen what happens when a conductor is electrically charged. Now, let's see what happens if we place a conductor in between the magnetic field.

When a conductor is placed or moved through the magnetic field it generates voltage i.e., electricity. This principle is called Electromagnetic Induction. The voltages generated will be based on the speed of the conductor moving through the electric field. Faster the speed of the conductor, the greater the induced electricity or voltage. A few properties of electromagnetic waves are:

Electromagnetic waves are propagated by oscillating waves electric and magnetic waves oscillating at right angles to each other
They exhibit the properties of interference and diffraction
They travel at a speed of 3 × 108 m/s in a vacuum.
They are transverse waves.
The relationship between the wavelength (λ) and frequency (c) of an electromagnetic wave is given as follows:

CONCLUSION

The problem consists of investigating displacement components, temperature distribution, Hall current and stress components in a homogeneous isotropic micropolar thermoelastic half space due to various sources subjected to laser pulse. Normal mode analysis technique is employed to express the results mathematically. The analysis of results permits some concluding remarks: (1) It is clear from the figures that all the field variables have nonzero values only in the bounded region of space indicating that all the results are in agreement with the generalized theory of thermoelasticity. (2) The effect of the Hall current, rotation and ultra-laser is much pronounced in all the resulting quantities. The new model is employed in magneto-micropolar thermoelastic medium as a new improvement in the field of thermoelasticity. The subject becomes more interesting due to Hall current involving rotation and irradiation of an ultra-laser pulse with an extensive short duration or a very high heat flux. This type of problems has found numerous applications. The method used in this article is applicable to a wide range of problems in thermodynamics. By the obtained results, it is expected that the present model of equations will serve as more realistic and will provide motivation to investigate micropolar thermoelasticity problems.