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Theory of Relativity

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E=mc2 is incorrect. It is interesting because I believe the energy part of the equation should represent all of energy and not just some of it. My solution to the problem is, K trans + K rotate=mc2. Following from my work will give us a more correct understanding of black holes and space itself.

Math, of, physics, relativity, science, special, theory

1 Introduction

Energy is equal to mass times acceleration. Contrary to popular belief E=mc2 is incorrect. A correct understanding of the Theory of Relativity is K trans, abrivated for, K translational motion, plus, K rotate, abriviation of, K rotational motion, is equal to mass, multiplied by the speed of light squared. For short, K trans + K rotate=mc2. The Special Theory of Relativity before was incorrect(because Albert Einstein was solving for an experiment and not a calculus equation in its entirety.) Furthering existing techniques requires an exploration of the Newtonian Mechanics to rotational motion. For objects with simple geometrical shapes, it is possible to calculate their moment of inertia with the assistance of calculus.

2 Sections

The physical nature of the moment of inertia and the conservation law of mechanical energy involving rotational motion will be explained.

3 Equations

We have considered the mechanical energy in terms of the potential and kinetic energy in the linear kinematics. As noted before, kinetic energy is the energy expressed through the motions of objects. Therefore, it is not surprising to recognize that a rotational system also has rotational kinetic energy associated with it. It is expressed in an analogous form as the linear kinetic energy as follows:

$$K_{trans} = ½mv^2 \Rightarrow K_{rotate} = ½I\omega^2. \quad (1)$$

ω is the angular speed in the unit of “radian”. It describes how fast an object spins.

Now the conservation of mechanical energy can be generalized to the rotational systems as: If there are only “conservative” forces acting on the system, the total mechanical energy is conserved.

$$E_i = E_f\,,\ E = K + P \Rightarrow K_i + P_i = K_f + P_f\,, K = K_{trans} + K_{rotate}. \quad (2)$$

Using the terms in this experiment,

$$\Rightarrow ½m_H v_i^2 + ½I_{disk}\omega_i^2 + m_H g h_i = ½m_H v^2 f + ½I_{disk}\omega^2 f + m_H g h f. \quad (3)$$

In this equation, mH is the mass of the hanging weight, and v its speed. $Idisk$ is the moment of inertia of the disk, and ω is the angular speed. h is the height of the hanging weight measured from the ground. In the experiment, the hanging weight and the disk are released from rest, and we measure the final speeds as the hanging weight reaches the floor. So Equation 3 becomes,

$$m_H g h_i = ½m_H v^2 f + ½I_{disk}\omega^2 f. \quad (4)$$

It is also noticed that the linear motion of the hanging weight is related to the spinning rate of the disk through the equation, $v = r\omega$, where r is the radius of the multi-step pulley around which the string wraps. Using this equation, Equation 4 becomes,

$$m_H g h_i = ½m_H r^2\omega^2 f + ½I_{disk}\omega^2 f. \quad (5)$$

In this equation, I_{disk} is the moment of inertia of the disk, and r is the radius of the multi-step pulley. Solving this equation for ωf,

$$\omega_{f,\,theo} = \sqrt{\frac{2m_H g h_i}{I_{disk} + m_H r^2}}\ . \quad (6)$$

You will use this equation to calculate the theoretical values of the final angular speeds.

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4 Experimental Determination of the Moment of Inertia

Fig. 1 shows a schematic of the experimental setup that you will use to experimentally determine the moment of inertia of the spinning platter.
Considering the rotational part of the system (taking a disk as an example) and ignoring the frictional torque from the axle, we have the following equation from Newton's second law of motion.

$$\tau = r\,T = I_{disk}a, \tag{7}$$

where I is the moment of inertia of the disk, r is the radius of the multi-step pulley on the rotary motion sensor and T is the tension on the string.
Considering the hanging mass (m_H), the analysis from the free-body-diagram tells us that,

$$m_H g - T = m_H a = m_H (ra). \tag{8}$$

Combining Eq.(1) and (2), we have,

$$r m_H (g - ra) = I_{disk} a, \tag{9}$$

from which I_{disk} can be determined as,

$$I_{disk} = \frac{r m_H (g - ra)}{a}. \tag{10}$$

FIGURE 1
Experimental Determination of The Moment of Inertia

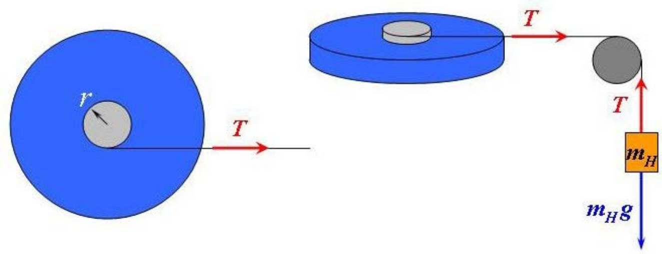

Fig. 1 Schematic of the system of the spinning disk and dropping weight.
Spinning objects of different shapes can also be determined experimentally in the same way.

TABLE 1
Linear and Rotational Analogues

Quantities in Translational Motions	Analogous Quantities in Rotational Motions
M =(mass)	I= (moment of inertia)
V= (velocity)	ω =(angular velocity)
$p = mv$= (linear momentum)	$L = I\omega$ =(angular momentum)
	½Iω²= (rotational kinetic energy)
½mv^2= (linear kinetic energy)	

5 Conclusion

In conclusion, I believe my results are correct because of the information I have provided above, and I'd also love for the work to speak for itself in its very own way.

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REFERENCES

[1] H. Stephen, *The Universe In A Nutshell*. New York, New York.: Bantam, pp. 3-26, 31-57, 108-109, 139, 2001

[2] S. Henry, *Fundamentals of Physics*. Holt, Rinehart and Winston, pp. 91-99, 108-119, 126-144, 148-149,163-170, 1966

[3] R. A. Colin, *The Universe Explained*. New York.: Henry Holt and Company, pp. 172-173,1994