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NEWTON AND MAXWELL

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ABSTRACT

Newton's laws and Maxwell equations

1. INTRODUCTION

1.1. *Newtons Laws*

Newtons first law says: *"Every body continues in its state of rest, or of uniform motion in a right line, unless it is compelled to change that state by forces impressed upon it."*

Newtons second law is

$$\vec{F} = m\vec{a} \tag{1}$$

where $\vec{F}$ is the force on a particle of mass m, and $\vec{a}$ is the particles acceleration.

Newton's third law says that for every action, there is an equal and opposite reaction.

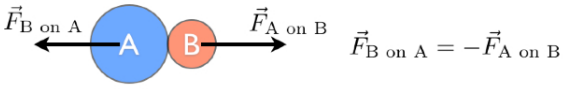

Fig. 1.— Newton's third law.

Wrapping up, Newton's second law (1) allows us to predict the future.

2. MAXWELLS EQUATIONS

Maxwells equations include Gausss law, which reads

$$\oint \vec{E} \cdot d\vec{a} = \frac{Q}{\epsilon_0} \tag{2}$$

in integral form.
Faraday law:

$$\oint \vec{E} \cdot d\vec{s} = -\frac{d\Phi}{dt} \tag{3}$$

Ampére law:

$$\vec{\nabla} \times \vec{B} = \mu_0 \vec{J} + \mu_0 \epsilon_0 \frac{\partial \vec{E}}{\partial t} \tag{4}$$

And finally, $\vec{\nabla} \cdot \vec{B} = 0$

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