

# 5 Equations That Changed the World





## **In memory of James Clerk Maxwell**

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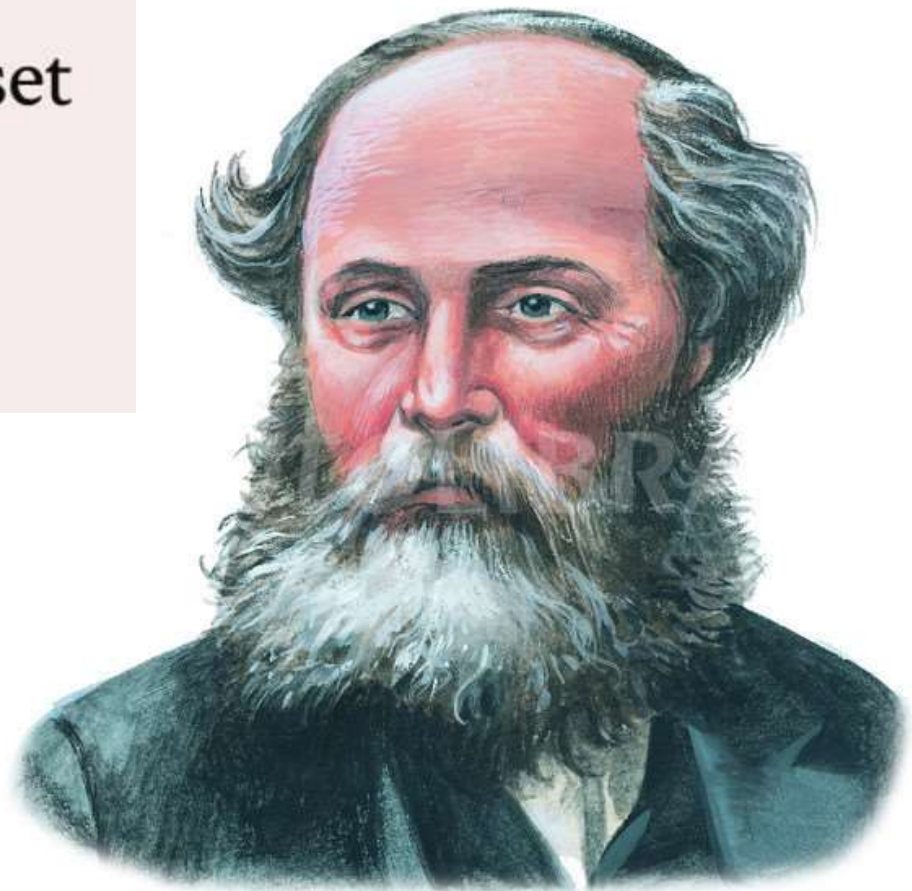
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*Man of Science,  
Man of God:  
James Clerk Maxwell*



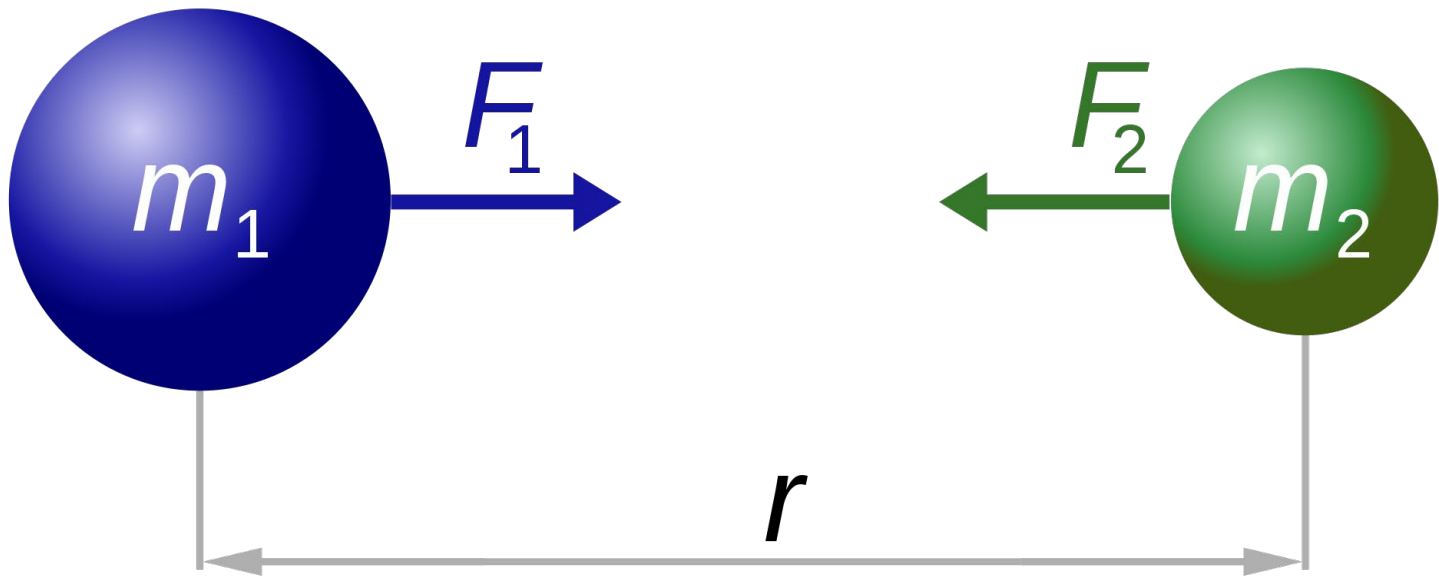
I have the capacity of being  
more wicked than any  
example that man could set  
me.

- James Clerk Maxwell -



# 1

## Newton's law of universal gravitation



$$F_1 = F_2 = G \frac{m_1 \times m_2}{r^2}$$



# 2

## Mass-energy equivalence

The diagram illustrates the mass-energy equivalence equation  $E = mc^2$  with the following components and annotations:

- Energy** (yellow text) with a yellow arrow pointing to the variable **E** (yellow).
- mass** (blue text) with a blue arrow pointing to the variable **m** (blue).
- squared** (black text) with a black arrow pointing to the superscript **2** (black).
- speed of light (constant)** (red text) with a red arrow pointing to the variable **c** (red).
- equals** (green text) with a green arrow pointing to the equals sign **=** (green).

The equation is presented as  $E = mc^2$ .

# Second Law of Thermodynamics

$$\Delta S_{\text{universe}} \geq 0$$

# 4

## Maxwell–Faraday equation

Induced electric field vector

$$\underbrace{\nabla \times}_{\text{Del cross operator means to take the curl}} \vec{E} = - \frac{\partial \vec{B}}{\partial t}$$

Del cross operator  
means to  
take the curl

The rate of change  
of the magnetic  
flux density vector



# 5

## Bernoulli's Equation

$$P + \frac{1}{2} \rho v^2 + \rho gh = \text{constant}$$

where  $P$  is the pressure,  $\rho$  is the density,  $v$  is the velocity,  $h$  is elevation and  $g$  is the gravitational acceleration.

An equation means  
nothing to me  
unless it expresses  
a thought of God.

- Srinivasa Ramanujan

