May 14, 2013
Collection of mathematical a physical formula,
For my fundamental research

Pierre de FERMAT	
Il n'existe pas de nombres entiers non nuls x, y et z tels que : $$x^n + y^n = z^n$$ dès que n est un entier strictement supérieur à 2. Démontre par Andrew Wiles en 1995	

Ludwig BOLTZMANN	
$$S = k \log_e W$$ where k = 1.3806505(24) × 10−23 J K−1 is Boltzmann's constant, and the logarithm is taken to the natural base e. W is the Wahrscheinlichkeit, the frequency of occurrence of a macrostate or, more precisely, the number of possible microstates corresponding to the macroscopic state of a system	
The Boltzmann equation was developed to describe the dynamics of an ideal gas $$\frac{\partial f}{\partial t} + v\frac{\partial f}{\partial x} + \frac{F}{m}\frac{\partial f}{\partial v} = \frac{\partial f}{\partial t}\Big\|_{\text{collision}}$$ Where f represents the distribution function of single-particle position and momentum at a given time (see the Maxwell–Boltzmann distribution), F is a force, m is the mass of a particle, t is the time and v is an average velocity of particles.	
Boltzmann’s Constant	

$$k = \frac{R}{N_A}$$

K is a physical constant relating energy at the individual particle level with temperature. It is the gas constant R divided by the Avogadro constant NA

Max PLANCK

Plancksches Strahlungsgesetz und Wirkungsquantum
Planck's radiation law and the quantum of action

Clausius generalized formulation its always on, and came in 1865 to a new formulation. For this purpose he introduced the concept of entropy (S), which he defined as a measure of the reversible addition of heat in proportion to the absolute temperature:

$$\mathrm{d}S = \frac{\mathrm{d}Q}{T}$$

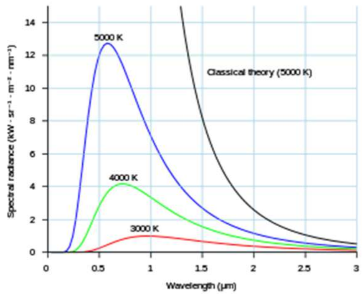
The preliminary result, the Planck on 19 October 1900 presented a lecture at the Academy of Kurlbaum following, at that time still contained two undetermined constants. In the following weeks Planck brought the law to its final form:

$$B_\nu(T) = \frac{2h\nu^3}{c^2}\frac{1}{e^{\frac{h\nu}{k_B T}} - 1}, \text{ or } B_\lambda(T) = \frac{2hc^2}{\lambda^5}\frac{1}{e^{\frac{hc}{\lambda k_B T}} - 1}$$

Where
B : spectral radiance of th black body,
T : absolute temperature,
v : frequency of the emitted radiation
λ : wavelength
KB : Boltzmann constant
h: Planck constant
c : Speed of light

This formula is pioneer result of modern physics and quantum theory.

Plaque at the *Humboldt University* of Berlin:
"Max Planck,
Discoverer of the Elementary Quantum of Action *h*, taught in this building from 1889 to 1928."

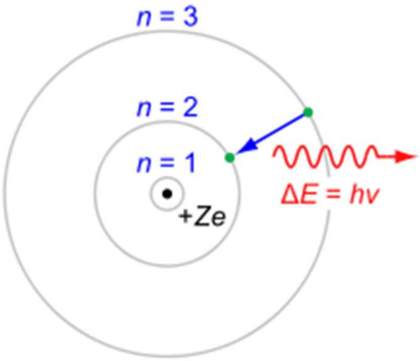


Planck's law (colored curves) accurately described black body radiation, by proposing that electromagnetic radiation was emitted in quanta. It successfully resolved the ultraviolet catastrophe (black curve), a major problem of classical physics, and is one of the pioneering results that gave birth to quantum mechanics.

The Planck Constant:

$$E = h\nu$$

Where E is energy of a photon, and v is its associated electromagnetic wave.	

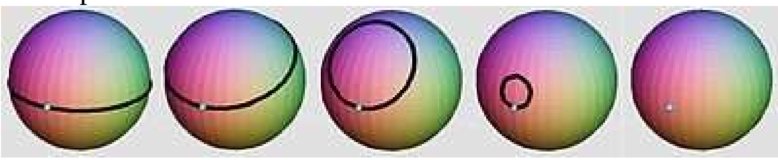
Niels BOHR Atom's Model	
	In 1885, *Johann Balmer* had come up with his Balmer series for describing the visible **spectral lines of a hydrogen atoms**: $$\frac{1}{\lambda} = R_{\mathrm{H}}\left(\frac{1}{2^2} - \frac{1}{n^2}\right) \quad \text{for } n = 3, 4, 5, \ldots$$ Where λ is the wavelength of the absorbed/emitted light and *RH* is known as the *Rydberg constant*. Balmer's formula was corroborated by the discovery of additional spectral lines; but for thirty years, no one could explain why it worked.
The Bohr model of the hydrogen atom. A negatively charged electron confined to an atomic shell orbits a small, positively charged atomic nucleus and a quantum jump between orbits is accompanied by an emitted or absorbed amount of electromagnetic radiation.	In the first paper of his Trilogy, Bohr was able to derive it from his model: $$R_Z = \frac{2\pi^2 m_e Z^2 e^4}{h^3}$$ Where *me* is the electron's mass, *e* is its charge, *h* is *Planck's constant* and *Z* is the atom's atomic number (which is 1 for Hydrogen).

Lorentz's theory of electrons (to develop)

Poincaré’s Conjecture

Every “simply connected”, closed 3-manifold is “homeomorphic” to the 3-sphere.

For compact 2-dimensional surfaces without boundary, if every loop can be continuously tightened to a point, then the surface is topologically “homeomorphic” to a 2-sphere (usually just called a sphere). The Poincaré conjecture asserts that the same is true for 3-dimensional spaces.



Ackermann Function:

This is one of the simplest and earliest-discovered examples of a total computable function that is not primitive recursive. All primitive recursive functions are total and computable, but the Ackermann function illustrates that not all total computable functions are primitive recursive.

After Ackermann's publication[1] of his function (which had three nonnegative integer arguments), many authors modified it to suit various purposes, so that today "the Ackermann function" may refer to any of numerous variants of the original function. One common version, the two-argument Ackermann–Péter function, is defined as follows for nonnegative integers m and n:

$$A(m,n) = \begin{cases} n+1 & \text{if } m = 0 \\ A(m-1, 1) & \text{if } m > 0 \text{ and } n = 0 \\ A(m-1, A(m, n-1)) & \text{if } m > 0 \text{ and } n > 0. \end{cases}$$