Mechanica

$$\mathbf{p} = m\mathbf{v}$$

$$\mathbf{F} = m\mathbf{a}$$

$$\mathbf{F}_{actie} = -\mathbf{F}_{reactie}$$

Zwaartekrachtswet

$$F_{zw} = \mathrm{G_N}\frac{m_1 m_2}{r^2}$$

Isaac Newton

Thermodynamica

$$dE = \bar{d}W + \bar{d}Q$$

$$\frac{dS}{dt} \geq 0 \qquad\qquad dS = \frac{\bar{d}Q}{T}$$

$$T \to 0 \qquad \Rightarrow \qquad \frac{dS}{dT} \to 0$$

Kinetische gastheorie

$$\left(\frac{\partial}{\partial t} + \mathbf{v}_1 \cdot \nabla_{\mathbf{r}} + \frac{\mathbf{F}}{m} \cdot \nabla_{\mathbf{v}_1}\right) f_1 =$$

$$\int d\Omega \int d\mathbf{v}_2 \; \sigma(\Omega) |\mathbf{v}_1 - \mathbf{v}_2| (f_1' f_2' - f_1 f_2)$$

Ludwig Boltzmann

Toestandsvergelijking verdund gas

$$(P + \frac{a}{V^2})(V - b) = RT$$

Johannes Diederik van der Waals

Hydrodynamica

$$\frac{\partial \rho}{\partial t} + \boldsymbol{\nabla} \cdot (\rho \mathbf{u}) = 0$$

$$\left(\frac{\partial}{\partial t} + \mathbf{u} \cdot \nabla\right) \mathbf{u} = \frac{\mathbf{F}}{m} - \frac{1}{\rho} \nabla \left(P - \frac{\mu}{3} \nabla \cdot \mathbf{u}\right) + \frac{\mu}{\rho} \nabla^2 \mathbf{u}$$

$$\left(\frac{\partial}{\partial t} + \mathbf{u} \cdot \nabla\right) \theta = \frac{1}{c_v} (\nabla \cdot \mathbf{u}) + \frac{K}{\rho c_v} \nabla^2 \theta$$

Navier-Stokes

Electrodynamica

$$\nabla \cdot \mathbf{D} = \rho \quad \nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t}$$

$$\nabla \cdot \mathbf{B} = 0 \quad \nabla \times \mathbf{H} = \mathbf{j} + \frac{\partial \mathbf{D}}{\partial t}$$

James Clerk Maxwell

Soliton vergelijking

$$\frac{\partial u}{\partial t} + \frac{\partial^3 u}{\partial x^3} + 6u\frac{\partial u}{\partial x} = 0$$

Korteweg – De Vries

Algemene relativiteitstheorie

$$R_{\mu\nu} - \frac{1}{2} g_{\mu\nu} R = 8\pi \mathrm{G_N} \, T_{\mu\nu}$$

Albert Einstein

Speciale relativiteitstheorie

$$E = mc^2 = \sqrt{m_0^2 c^4 + p^2 c^2}$$

Albert Einstein

Quantummechanica

$$\imath\hbar\frac{\partial}{\partial t}\Psi(\mathbf{x},t)=\left[-\frac{\hbar^2}{2m}\nabla^2+V(\mathbf{x})\right]\Psi(\mathbf{x},t)$$

Erwin Schrödinger

Quantumtheorie van het Electron

$$\left\{\gamma^{\mu}(i\frac{\partial}{\partial x^{\mu}} - eA_{\mu}) - m_{e}\right\}\Psi(x) = 0$$

Paul Dirac

Electrozwakke sector van het Standaardmodel

$$\mathcal{L}_{SM} = \mathcal{L}_{ijk} + \mathcal{L}_{fermion} + \mathcal{L}_{scalar} + \mathcal{L}_{int}$$

$$\mathcal{L}_{ijk} = -\frac{1}{4} G_a^{\mu\nu} G_{\mu\nu}^a - \frac{1}{4} B^{\mu\nu} B_{\mu\nu}$$

$$\mathcal{L}_{fermion} = \sum_i \bar{\psi}_i (i \not{\partial} + g' \not{W}^a t_a + g \not{B} Y) \psi_i$$

$$\mathcal{L}_{scalar} = -(D_\nu \phi)^\dagger (D^\nu \phi) - \mu^2 (\phi^\dagger \phi) + \lambda (\phi^\dagger \phi)^2$$

$$\mathcal{L}_{int} = -\sum_{i,j} \left(c_{ij} \bar{\psi}_{Li} \phi \psi'_{Rj} \right)$$

Quantum Chromodynamica

$$\mathcal{L}_{QCD} = -\frac{1}{2}Tr(F^{\mu\nu}F_{\mu\nu}) + \bar{\Psi}(i\not{\partial} - M + g_s \not{A}^a T_a)\Psi$$

$$F_{\mu\nu} = \partial_\mu A_\nu - \partial_\nu A_\mu - ig_s[A_\mu, A_\nu]$$

Stringtheorie

$$S_P = -\frac{1}{4\pi\alpha'} \int_M \ d\tau d\sigma \ \sqrt{-\gamma}\ \gamma^{ab}\partial_a X^\mu \partial_b X_\mu$$

Alexander Polyakov