

Fundamental Physics

Emergent Physics

Elementary Particles, Elementary Forces The Standard Model (for 50 years)

Gravity

Mesons, Baryons (particle zoo)

Atoms, some molecules

Nuclear physics

Cosmology

Statistical mechanics

Fluid mechanics

Condensed matter physics

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Quarks, leptons
Vector bosons ('forces')

- Photon
- Weak
- Gluons

Higgs boson

Einstein (classical)

- Waves
- Black holes

QFT in curved background

- Hawking radiation

Puzzles and speculation

Quantum Field Theory (QFT)

- Particles
- Green functions (scattering)

Organizing principles

- Poincare group
- Internal symmetries – QED, Weak, QCD
- Broken symmetries

Computational machinery

- Path integrals
- Renormalization (predictive at short distance)
- Approximation methods – eg. Feynman diagrams

- Information paradox
- No consensus for small-distance predictions
 - Nonrenormalizable without adding a lot to standard model
- String theory