

Fields, symmetries, mass,...

You expect me to understand all that?

Fields

- Necessary for "action at a distance"



- Disturbance \rightarrow wave \rightarrow smallest wave \equiv particle

Symmetry (breaking)

- (Electroweak) symmetry breaking: mass of γ vs. W, Z



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Symmetry (breaking)

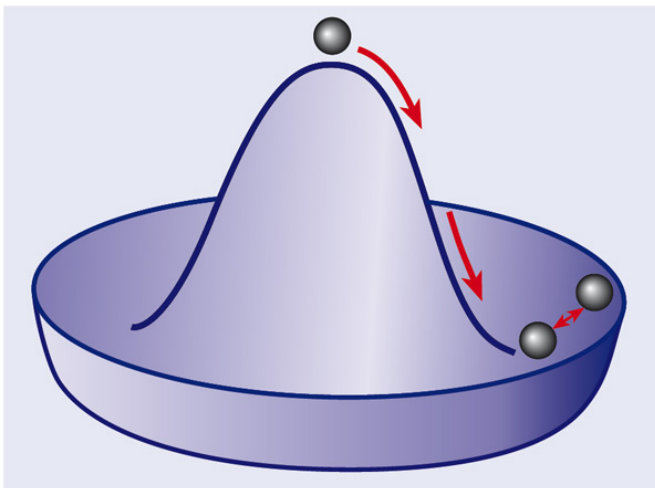
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- Spontaneous symmetry breaking through background field

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- Spontaneous symmetry breaking through background field
- Relation to mass

Mass = coupling to Higgs-field

- Interaction with field leads to mass
- Illustrate with analogies
 - ▶ Reception
 - ▶ Swimming pool

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- **Crucial: show limits of analogy**

Illustration of scientific process

- ▶ Visualise subatomic world
- ▶ Understand physics
- ▶ Build model
- ▶ Refine understanding
- ▶ Go to better analogy

Other examples

- Scalar field (meteorology)
- Precision (flat earth)
- Spin (angular momentum)
- ...

- Radiation
- Neutrino/meson oscillations
- Dark energy, vacuum pressure
- Particle decay
- Luminosity
- 5σ
- ...