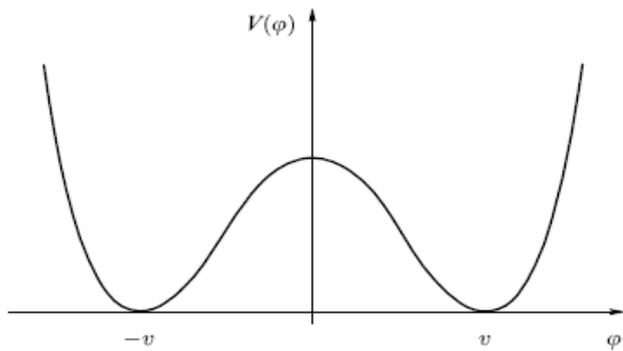
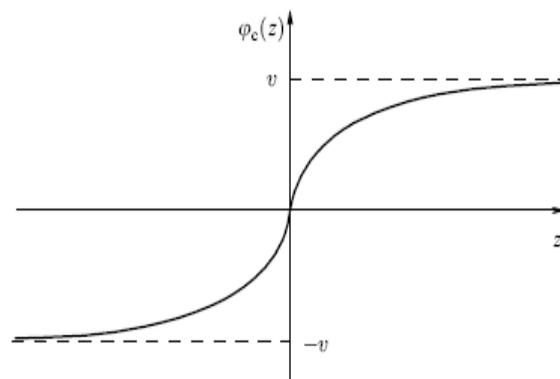


1. Branes:

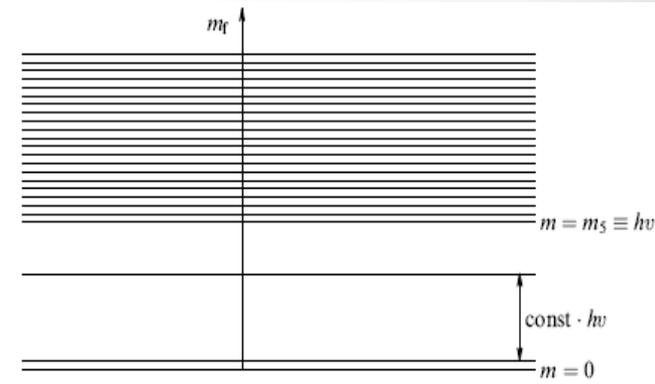
The matter fields can be localized (“captured”) within narrow hyper-surface (“brane”), while extra dimension(s) can be **large**. This can be realized with the help of scalar field interacting with usual matter field



A scalar field (φ) in 5 (infinite) dimensions



It leads to domain wall dividing 5d space-time on two parts with respect to one (z) of the dimensions.



A fermion (ψ) has a Yukawa coupling with given scalar field ($h\varphi\psi\psi$). Then fermion gets mass states as shown on the picture, where zero-state turns to be localized (captured) near $z=0$ (domain wall), damping as $\exp(-hv|z|)$.

Possible consequences:

1. $e^+e^- \rightarrow$ nothing
2. Decay of massive particles, e.g. DM.

2. Baryosynthesis:

Sakharov and Kuzmin conditions:

- $\Delta B \neq 0$;
- $CP \neq 0$;
- out of equilibrium.

✓ GUT

$$X \rightarrow qq, r$$

$$X \rightarrow \bar{q}l, 1-r$$

$$\underline{X} \rightarrow \underline{q}\underline{q}, \underline{r}$$

$$\underline{X} \rightarrow \underline{q}\underline{l}$$

$$r \neq \underline{r}$$

$$n_B - n_{\underline{B}} \sim (r - \underline{r})n_X$$

$$B-L=0$$

✓ electroweak model

$$B+L=0$$

✓ SUSY model

✓ Spontaneous baryosynthesis

✓ model of Majorana neutrino mass

✓ from transitions between ordinary and mirror particles