Baryogenisis

$$\eta = \frac{n_B - n_{\bar{B}}}{n_\gamma} \sim 6 \times 10^{-10}$$ Why not zero?

Just Initial conditions?

a) Maybe, but why?

b) Inflation: should wash this out

→ Initial assymetry massively dilated

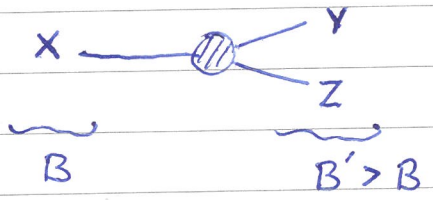
→ Re-heating: produces large density of new particles

What could produce this?

Sakharov Conditions

1) B violation

$X \longrightarrow Y, Z$



2) C & CP violation

$\bar{X} \longrightarrow \bar{Y}\bar{Z}$

require $R(X \to YZ) \neq R(\bar{X} \to \bar{Y}\bar{Z})$

3) Require departure from thermal equilibrium

$R(X \to YZ) \neq R(YZ \to X)$ (and Inverse)

In equilibrium: $\frac{n_X}{n_{\bar{X}}} \sim \exp\left(-(E_X - E_{\bar{X}})/T\right) = 1$ (detailed balance)

Require $R(YZ \to X) \lesssim H$ Universe expansion

decay: still occurs!