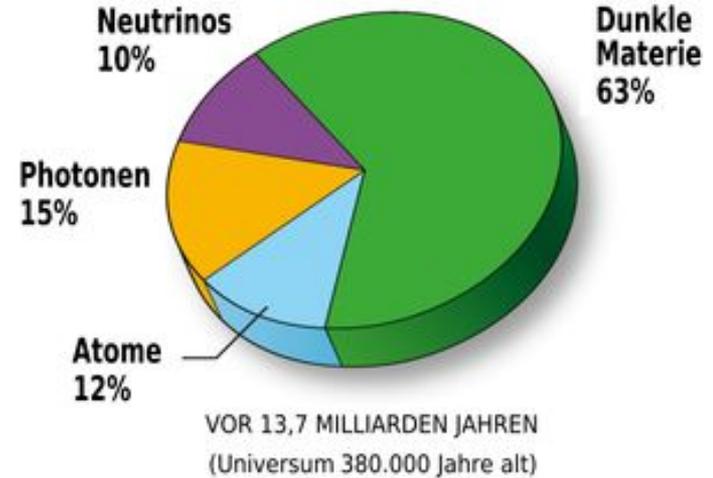
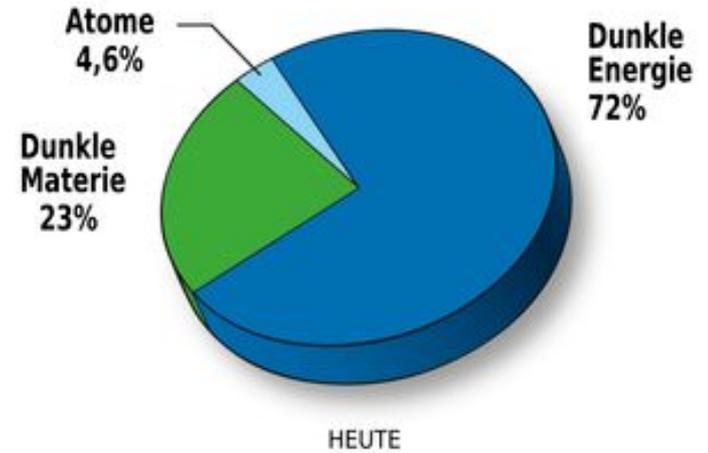
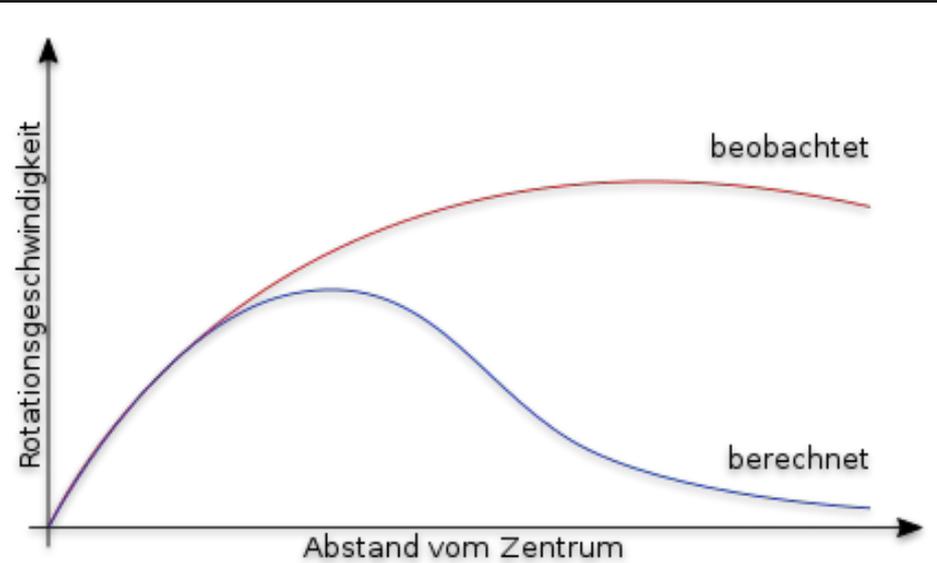


Kosmologie

Dunkle Energie, die Form des Universums und die
Hubble-Spannung

Was ist dunkle Materie?

Gravitative Wechselwirkung,
Aber unsichtbar



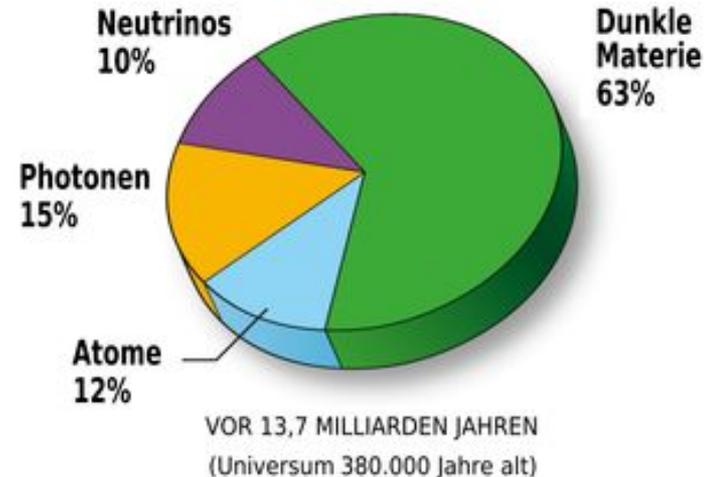
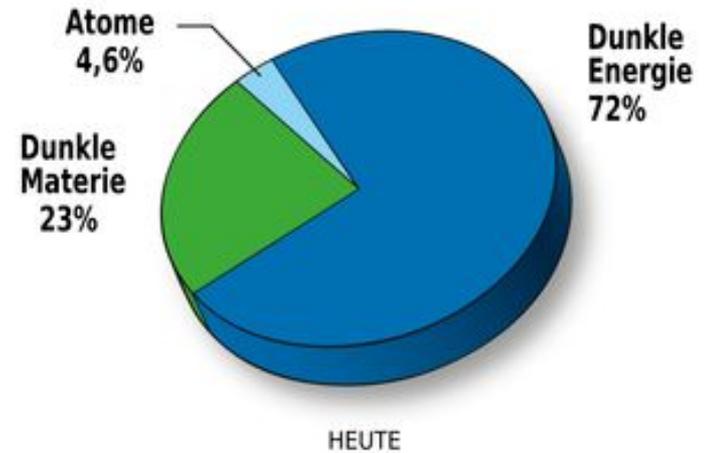
Was ist dunkle Energie?

Überall im Universum

Sorgt für die beschleunigte Ausdehnung

Heutiger Wert von $H \approx (70 \pm 5) \text{ km}/(\text{s Mpc})$

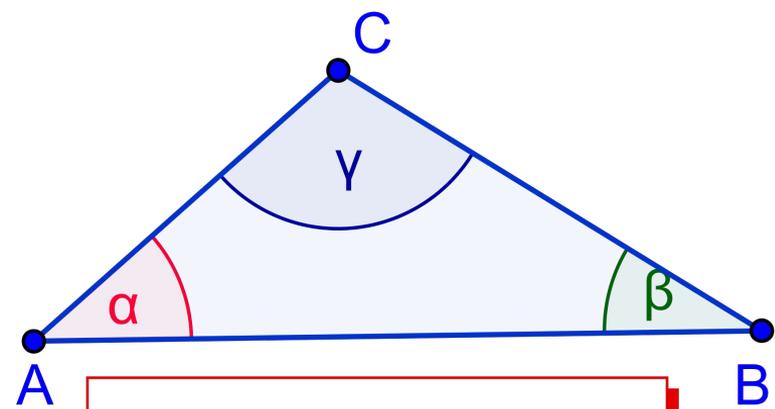
1 Mpc = 3'260'000 Ly



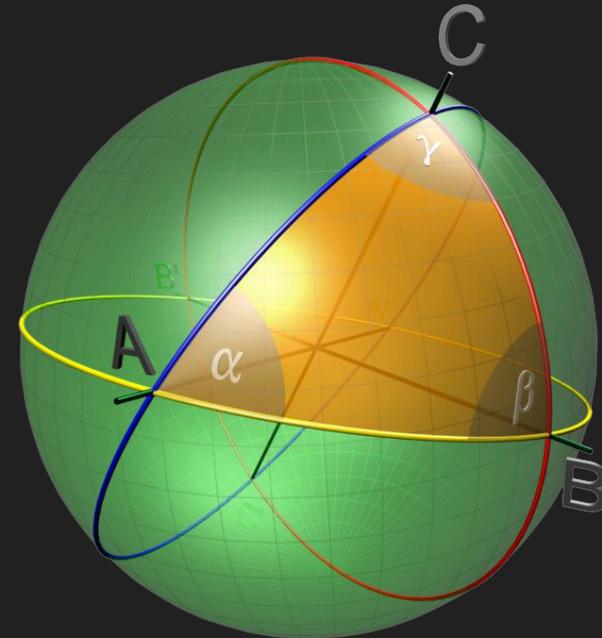
Ein bisschen Geometrie

Innenwinkelsumme im Dreieck ist immer 180°

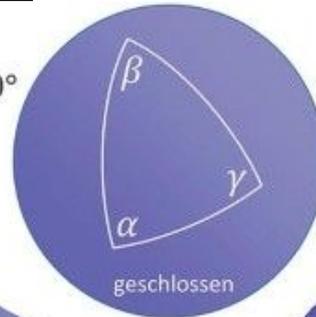
Aber nur, wenn das Dreieck flach ist



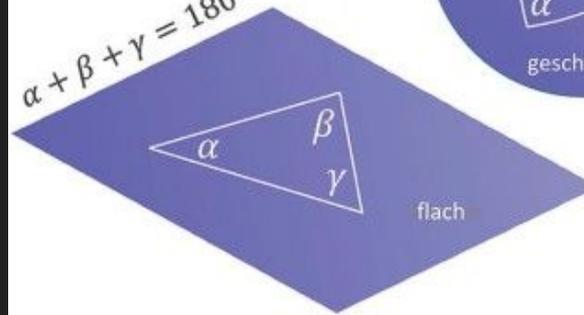
$$\alpha + \beta + \gamma =$$



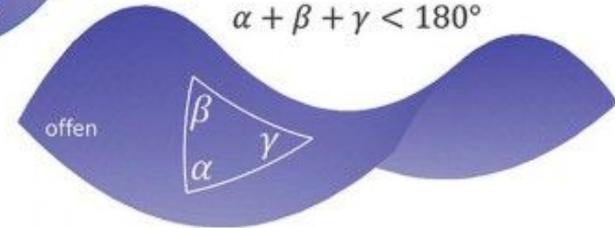
$$\alpha + \beta + \gamma > 180^\circ$$



$$\alpha + \beta + \gamma = 180^\circ$$



$$\alpha + \beta + \gamma < 180^\circ$$



Krümmung des Universums

Man findet: Innenwinkelsumme grosser Dreiecke im Universum = 180°

Instabiles Gleichgewicht

