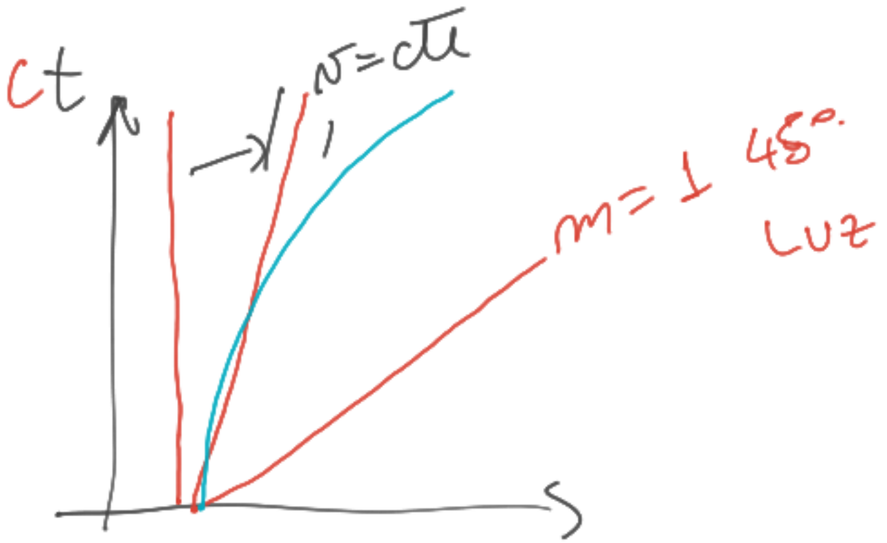
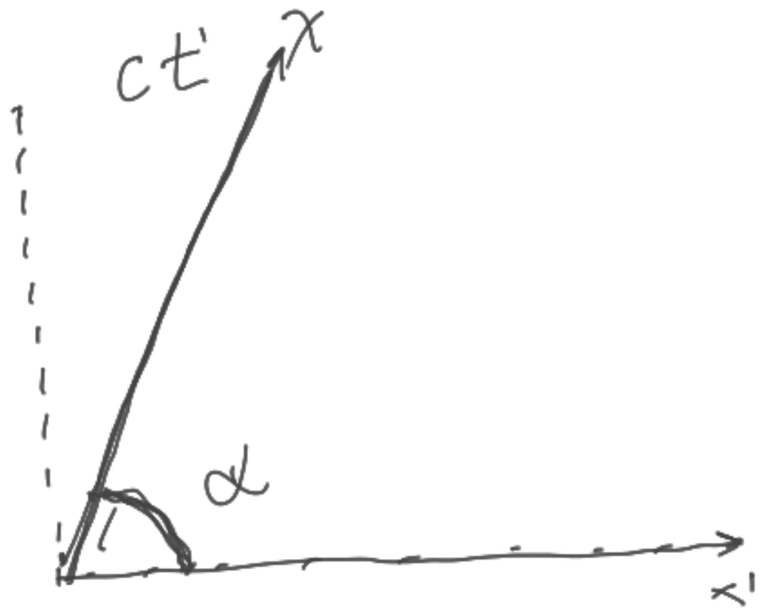
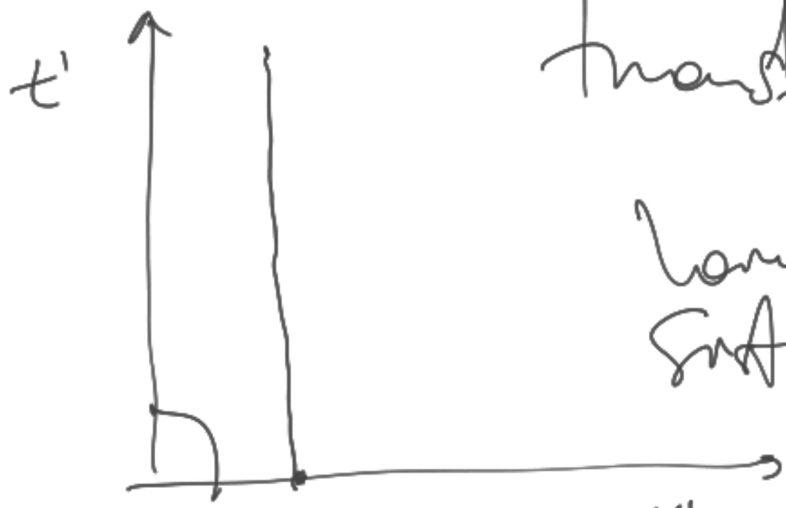
- **Unidad** 04-Cosmología
- **Clase** U04C02 - 15/16
- **Fecha** 18 Nov 2020 (11 Nov)
- **Cont** El Big Bang
- **Cátedra** Asorey
- **Web** https://gitlab.com/asoreyh/unrn-ipac/

RIO NEGRO

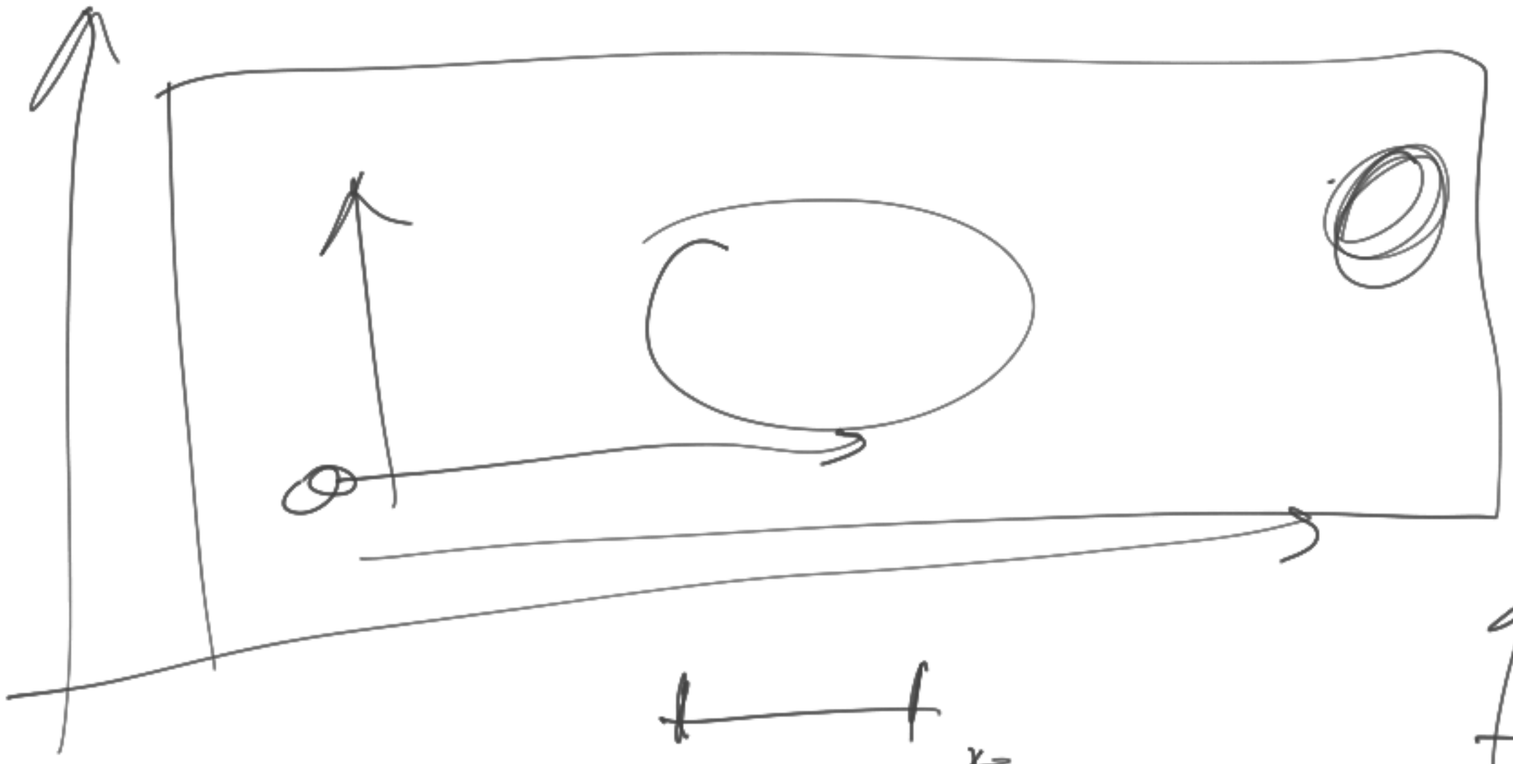
NOTAS DE CLASE

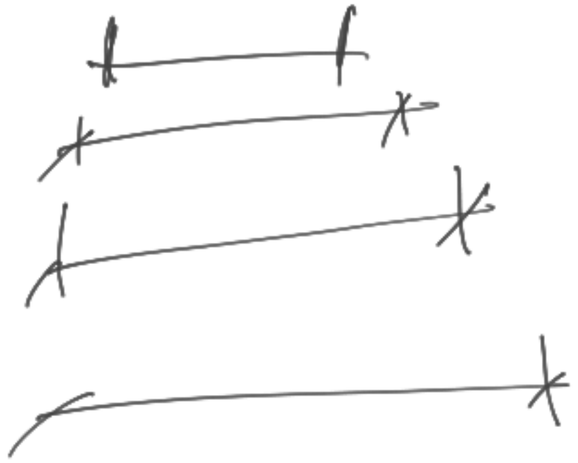


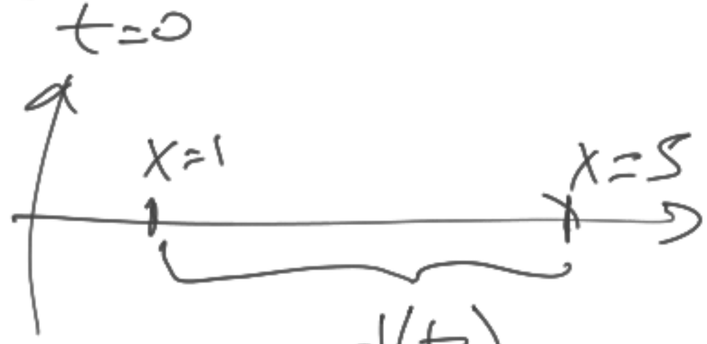




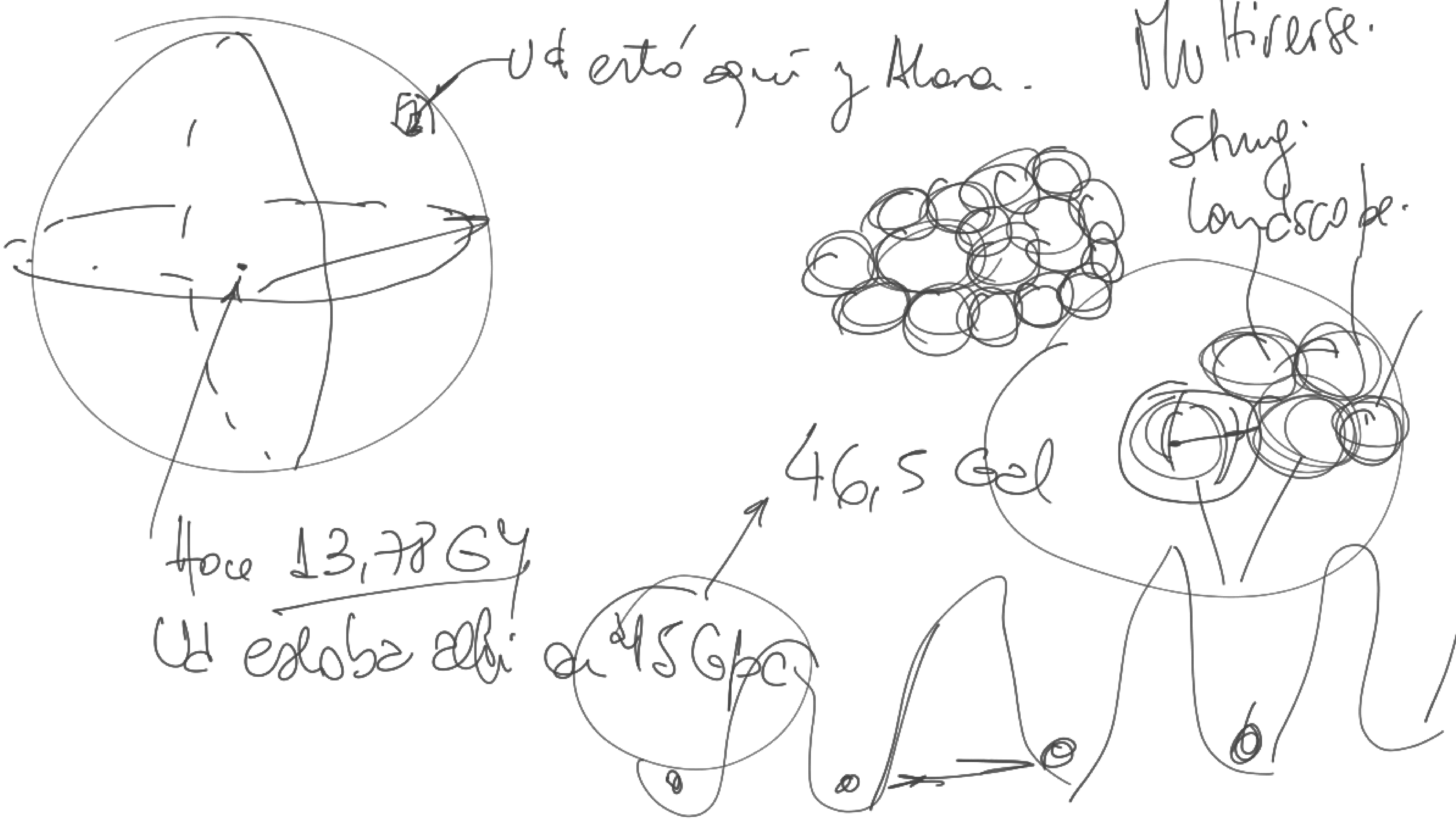
Transformación de Lorentz al SRA Giovil (Boost).






t=0
x=1
x=5
d(t0)


t=1000
d(t1000)
x=1
x=5


Ud está aquí y Ahora.
Multiverse.
String landscape.
46,5 Gal
Hace 13,78 GY
Ud estaba allí a 45 Gpc

$T^{\mu\nu} = G^{\mu\nu}$

tiempo

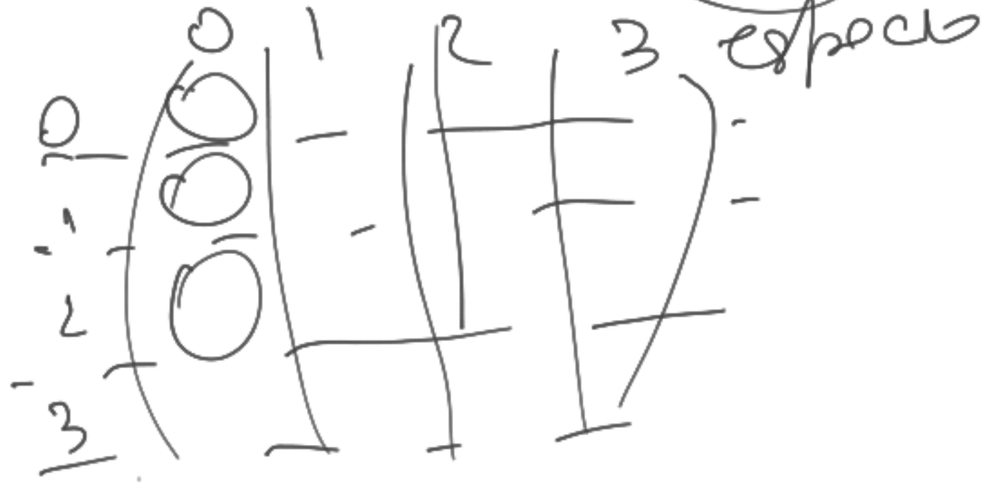
espacio

$\mu, \nu, \rho, \sigma \ldots = 0, 1, 2, 3$

tensor Energía momento

$T^{\mu\nu}$

$i, j, k, \ldots = 1, 2, 3$ espacio



$$\frac{8\pi G}{c^4} T^{\mu\nu} = G^{\mu\nu} \qquad i_J = 0$$

Constante Cosmologique

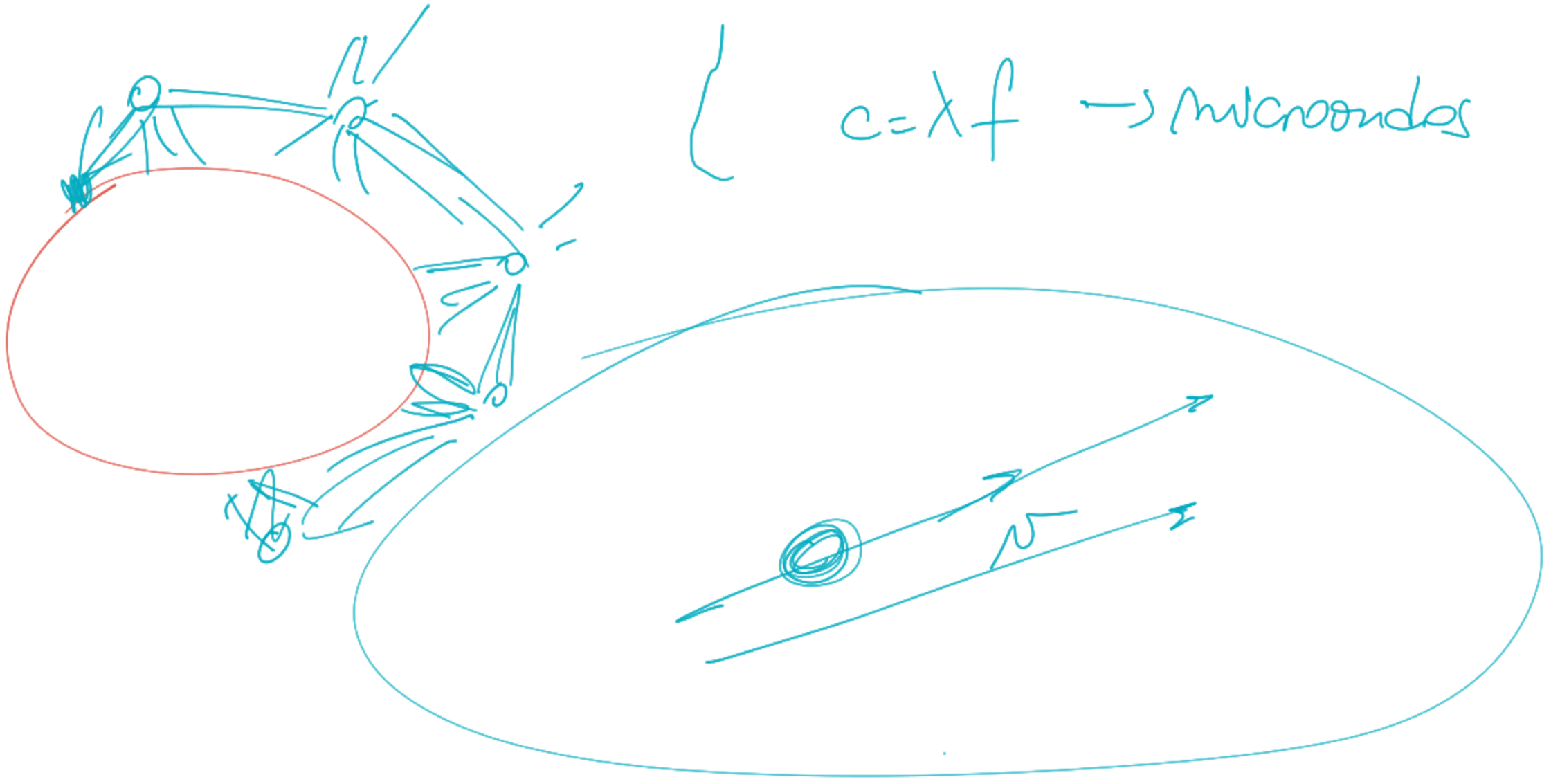
$$G^{\mu\nu} = R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu}$$

$$\left(\frac{8\pi G}{c^4}\right) T^{\mu\nu} = R^{\mu\nu} - \frac{1}{2} R g^{\mu\nu} + \Lambda g^{\mu\nu}$$

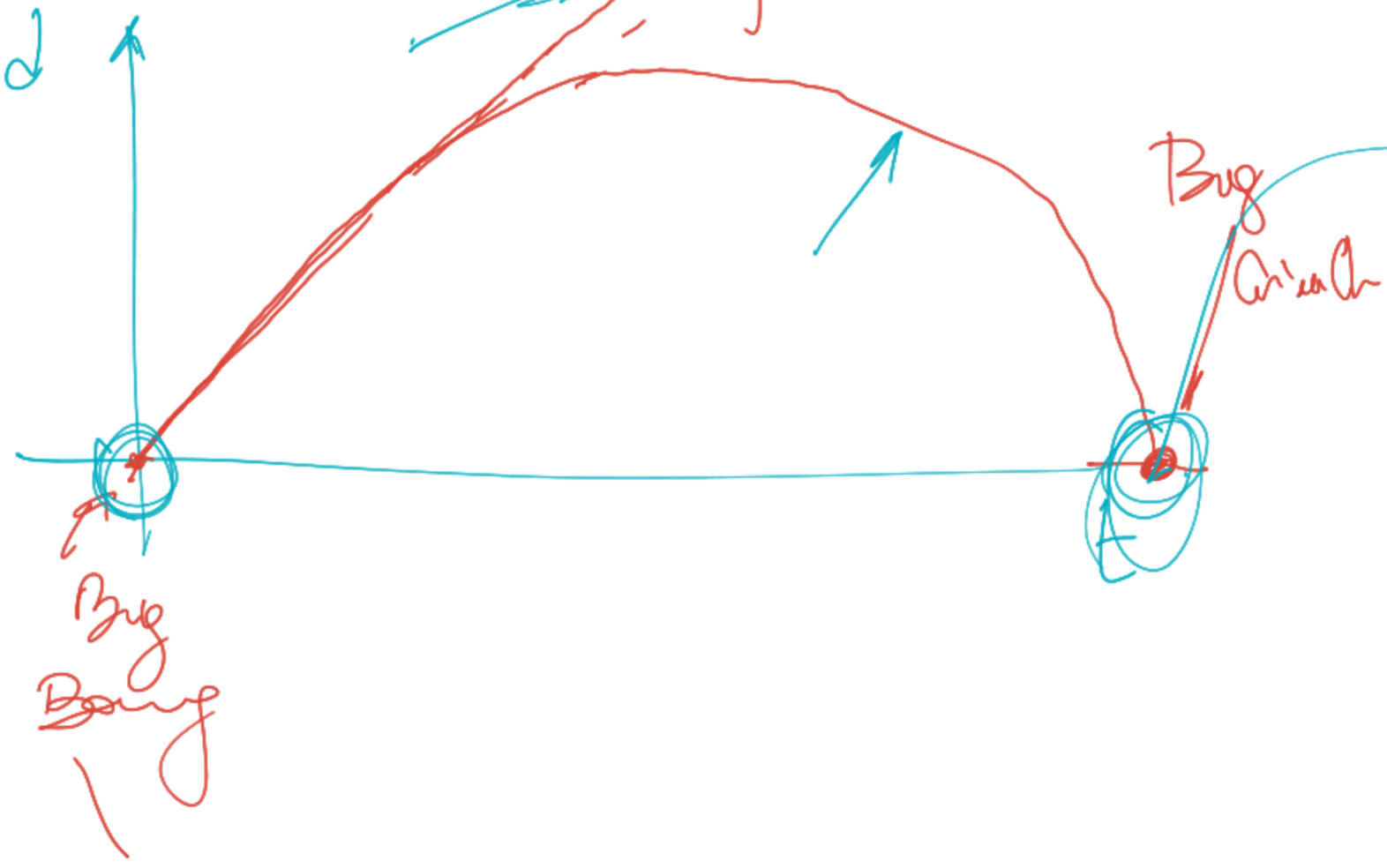
$a = 1$

$D(t) = a(t)\, D(t_0)$

$D(-1)$ . . .


c=λf → microondas

$$R_{SCH} = \frac{2GM}{c^2}$$



$v = H_0 R$

Velocidad de escape $v_e = \sqrt{\frac{2GM}{R}}$

M y $R \rightarrow M = \rho \cdot \frac{4}{3}\pi R^3$

$v_e^2 = \frac{2GM}{R} = \frac{2G}{R} \rho \frac{4}{3}\pi R^{\frac{2}{3}} \Rightarrow \rho = \frac{3 v_e^2}{8G\pi R^2}$

Densidad Crítica $\Rightarrow v = v_e \Rightarrow \rho = \rho_c \Rightarrow Dv = v_e$ Densidad

$v^2 = H_0^2 R^2 \Rightarrow \rho_c = \frac{3 H_0^2 R^2}{8\pi G R^2}$

$\Rightarrow \boxed{\rho_c = \frac{3 H_0^2}{8\pi G}}$

$$\Omega_i = \frac{\rho_i}{\rho_c} \qquad i = \text{bariones, materia, neutrinos...}$$

$$\Omega_T = \sum_{i=1}^{n} \frac{\rho_i}{\rho_c} \Rightarrow$$

$\Omega_T < 1 \rightarrow \rho < \rho_c$ Universo Abierto

$\Omega_T = 1 \rightarrow \rho = \rho_c$ Universo plano

$\Omega_T > 1 \rightarrow \rho > \rho_c$ Universo cerrado