Equations différentielles utilisées

$t' = H_0 * t\ ,\ k = 0 => \Omega_K = 0$
$a(t_0) = 1\ ,\ t_0 = 0 = now, a' = da/dt'$

VECTEUR a, a', T_b, T_r

$a' = \sqrt{\Omega_\Lambda * a^2 + \Omega_{m0}/a + \Omega_{ro}/a^2}$
$a'' = 1/2 * (2\Omega_\Lambda * a - \Omega_{m0}/a^2 - 2\Omega_{ro}/a^3)$
$T_b' = -2T_r * a'/a + Cste * T_r^4 * (T_r - T_b) * xe$
$T_r' = -T_r * a'/a$

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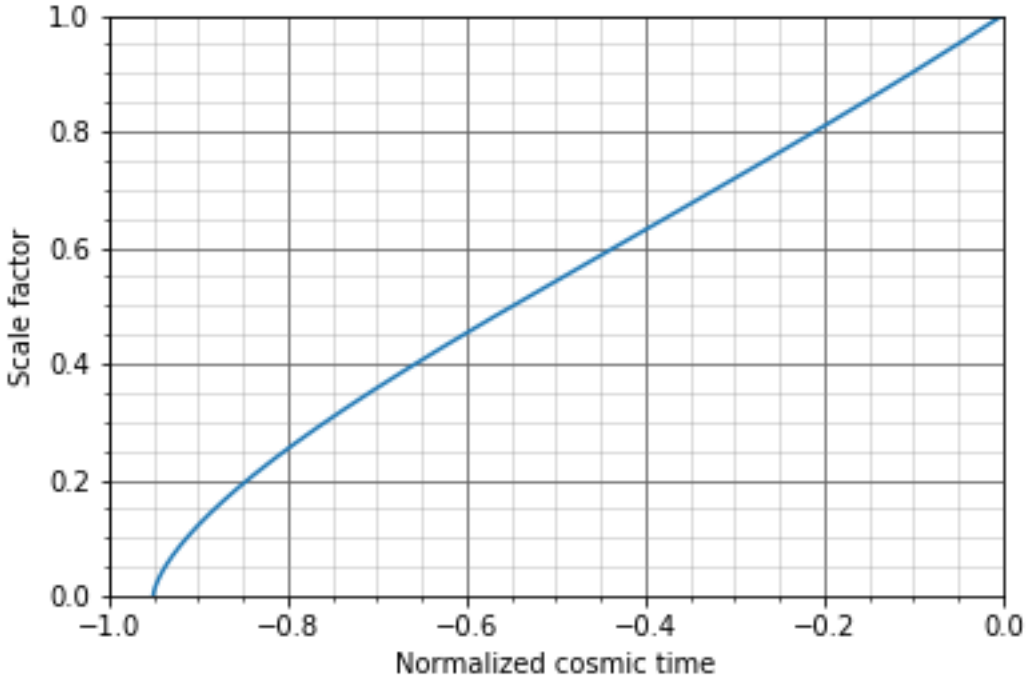
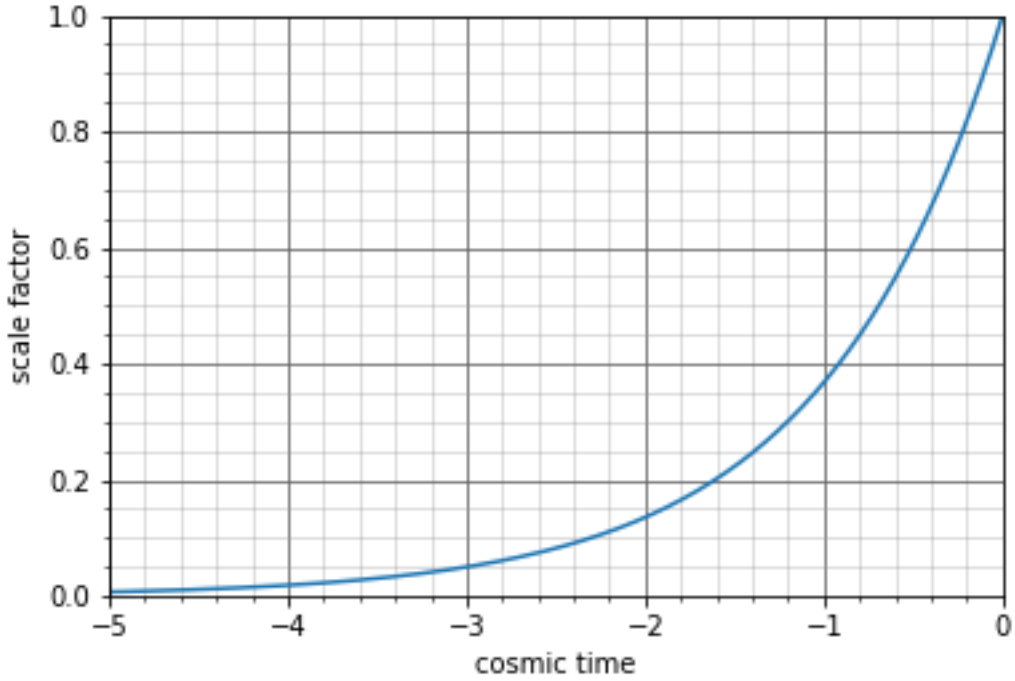
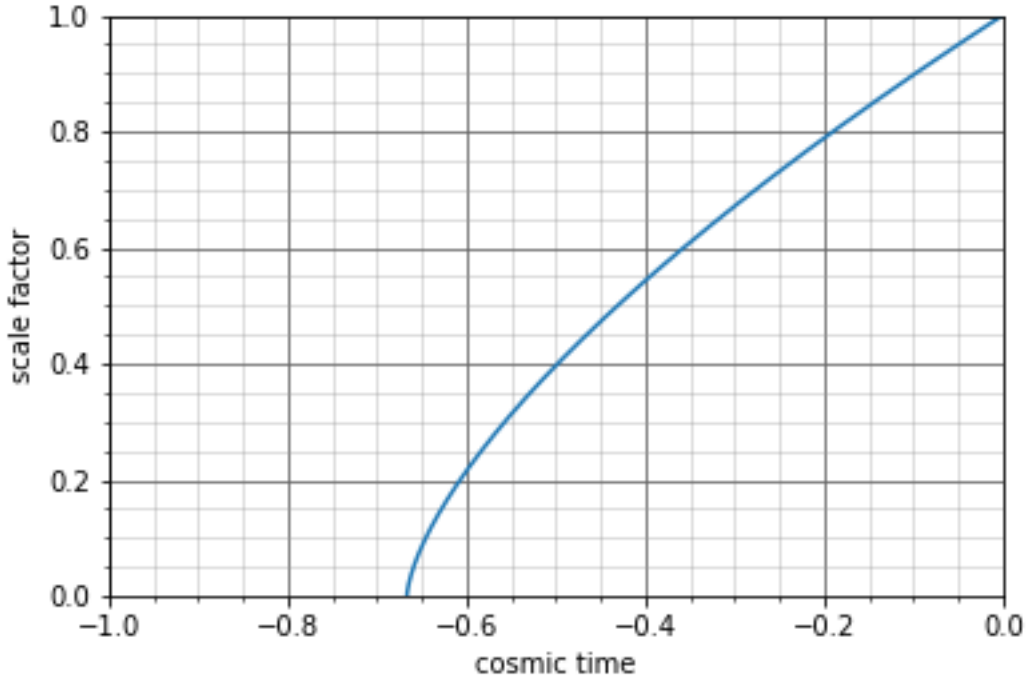

1.0
0.8
0.6
0.4
0.2
0.0
Scale factor
−1.0
−0.8
−0.6
−0.4
−0.2
0.0
Normalized cosmic time

UNIVERS DE SITTER

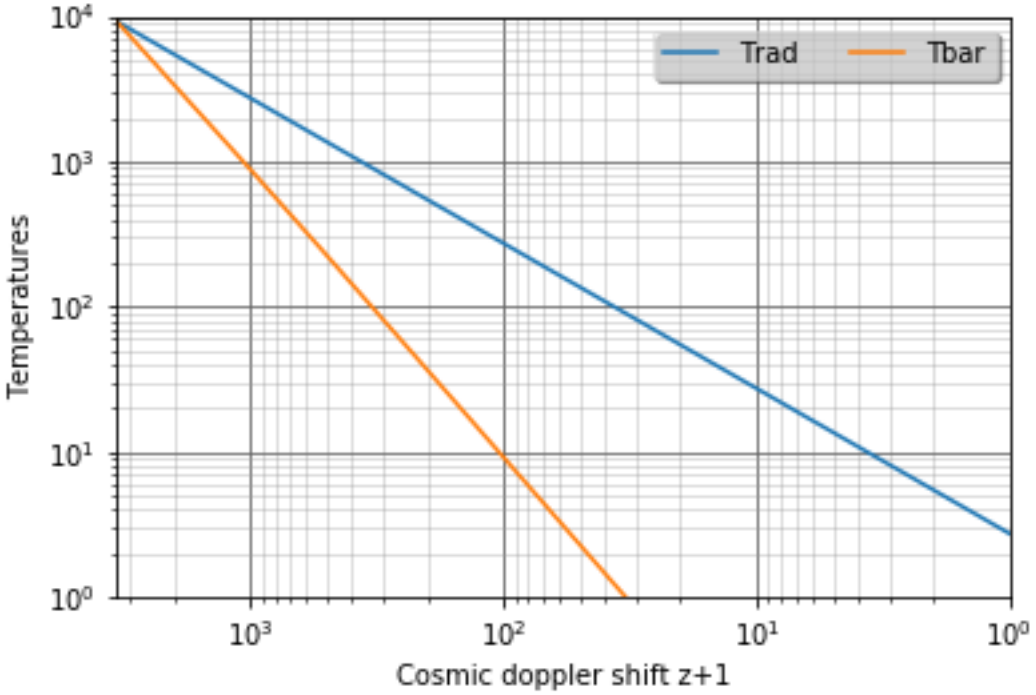


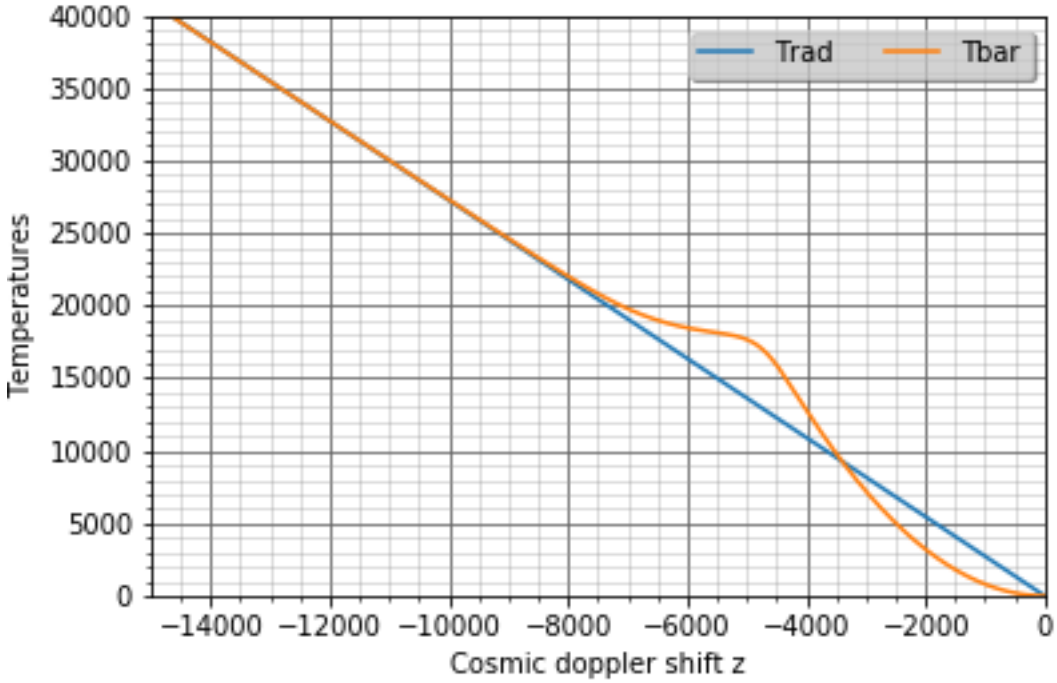
UNIVERS EINSTEIN DE SITTER



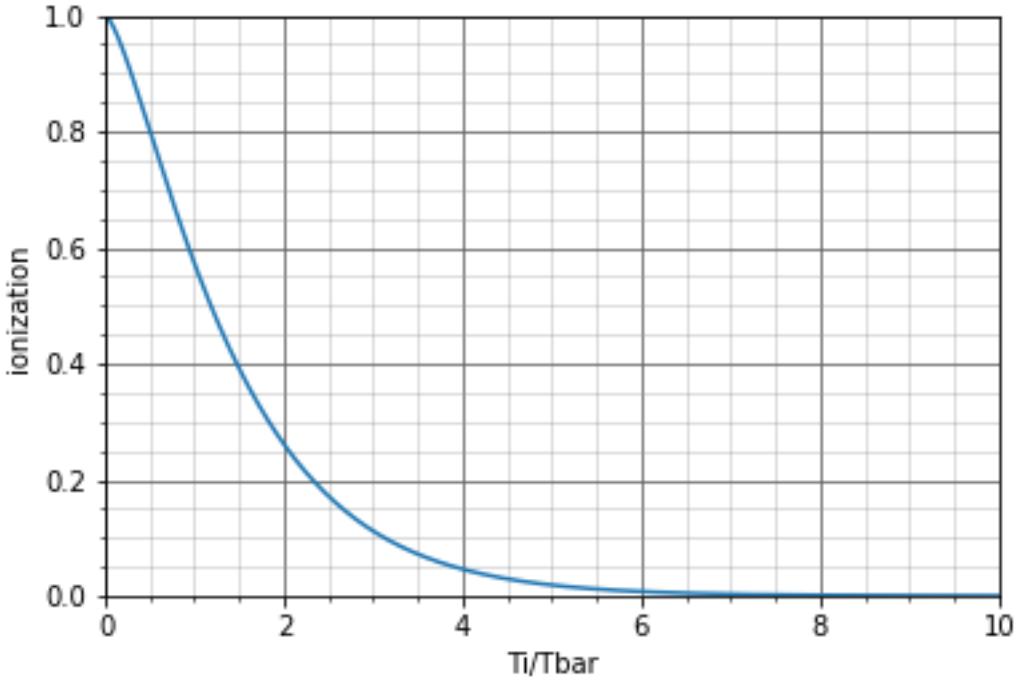
$$dT_{bar}/dt' = -2\frac{da}{dt'}\frac{1}{a}T_{bar} - \frac{8\sigma_T a}{3m_e c H_0}\ T^4_{rad_0}(T_{rad_0}/a - T_{bar})\frac{1}{a^4}\ x_e(T_I/T_{bar})$$

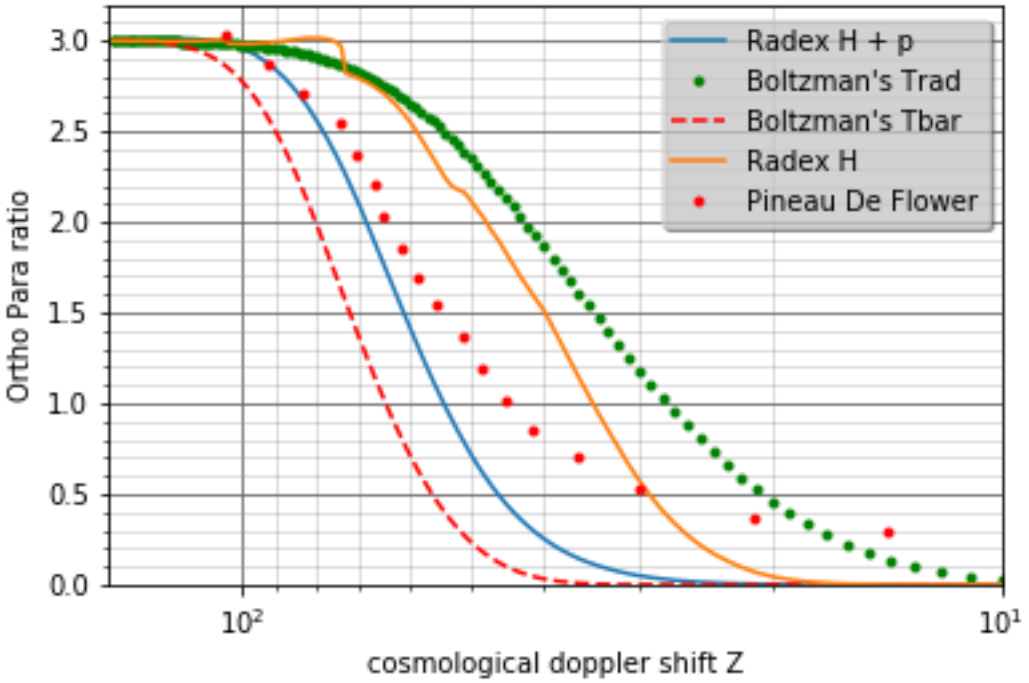
$$T_I = 13.6ev/k_b$$

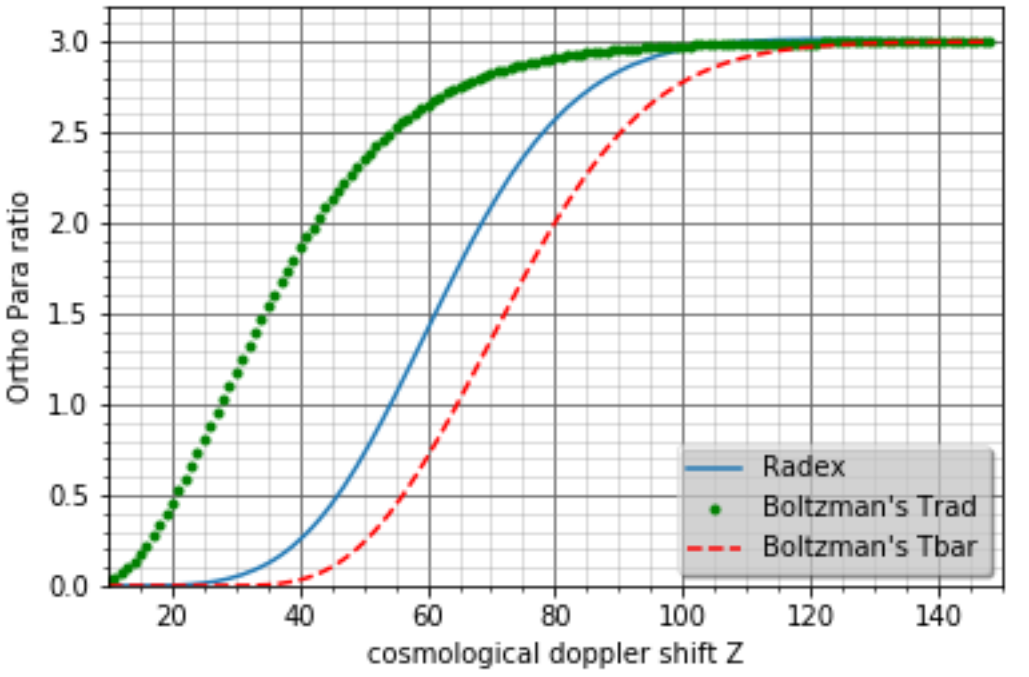



Trad
Tbar
Temperatures
Cosmic doppler shift z
40000
35000
30000
25000
20000
15000
10000
5000
0
−14000
−12000
−10000
−8000
−6000
−4000
−2000
0

$$x_e(x) = 1 - erf(\sqrt{x}) + 2 * \sqrt{x} * \exp(-x)/\sqrt{\pi}$$




Radex H + p
Boltzman's Trad
Boltzman's Tbar
Radex H
Pineau De Flower
Ortho Para ratio
cosmological doppler shift Z
3.0
2.5
2.0
1.5
1.0
0.5
0.0
10^2
10^1


Radex
Boltzman's Trad
Boltzman's Tbar
Ortho Para ratio
cosmological doppler shift Z
3.0
2.5
2.0
1.5
1.0
0.5
0.0
20
40
60
80
100
120
140