For obtaining of cosmic background radiation, Nehru used Tnat, but I think you should use T (3base) or T (effective). Larson cited in:

http://www.reciprocalsystem.com/bpm/bpm05.htm

Para la obtencion de la radiacion de fondo cosmico, Nerhu utiliza Tnat, pero creo que se deberia utilizar T(3base) o bien T(efectiva). Que cita Larson en:

http://www.reciprocalsystem.com/bpm/bpm05.htm

$\frac{8.314510 Jmol^{-1}K^{-1}}{6.0221367\times10^{23}mol^{-1}} = 1.380\,7 \times 10^{-16}\frac{erg}{K}$

$3/2 * 1.380\,7 \times 10^{-16}\frac{erg}{K} = 2.071\,1 \times 10^{-16}\frac{erg}{K}$

$T_{nat} = \frac{E_u}{C_{eu}} = \frac{1.49175*10^{-3}erg}{2.071\,1\times10^{-16}\frac{erg}{K}} = 7.202\,7 \times 10^{12}K$

T(3 base)=$(7.202\,7 \times 10^{12})^{\frac{3}{4}}\,K = 4.396\,6 \times 10^{9}K$

T (efectiva)= $(1 + 2/9) * 4.396\,6 \times 10^{9}K = 5.373\,6 \times 10^{9}K$

$T_d = T_{nat}\left(1 + \frac{16n^2}{Z}\right)$

$T_d = T(3base)\left(1 + \frac{16n^2}{Z}\right)$

$T_d = T(efectiva)\left(1 + \frac{16n^2}{Z}\right)$

Lr $\quad 5.373\,6 \times 10^{9}K \times \left(1 + \frac{16\times4^2}{103}\right) = 1.872\,9 \times 10^{10}K$