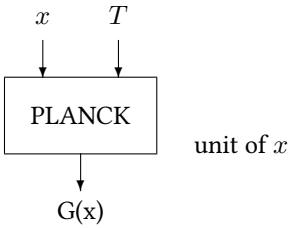
Block PLANCK

The PLANCK block simulates Planck's radiation law.





Name	PLANCK
Function	em0001
Inputs	2
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Parameters	0 . . . [1]
Strings	0
Group	S

Inputs

1 Wavelength λ/μm or photon energy / ev, depending on PARAMS(1)
2 Blackbody temperature T/K

Outputs

1 Blackbody radiation after Planck If $s = 0$ $G(x)/\mathrm{W\,m^{-2}\,\mu m^{-1}}$, if $s = 1$ $G(x)/\mathrm{W\,m^{-2}\,eV^{-1}}$
2 Blackbody radiation after Wien
3 Blackbody radiation after Rayleigh-Jeans

Parameters

1 Unit switch s. If $s = 0$ (default) input one is interpreted as wavelength in μm, if $s = 1$ input one is interpreted as energy in eV.

Strings

None

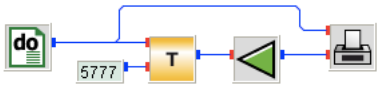
Description

The radiation law known as Planck's law is given by

$$G(\lambda) = 2\pi hc^2 \frac{1}{(\lambda^5 \exp(\frac{hc}{\lambda kT}) - 1)}$$

where λ denotes the wavelength, h is the Planck constant $6.6260755 \cdot 10^{-34}$ J s, c is the speed of light in vacuum 299 792 458 m s^{-1}, k is the Boltzmann constant $1.380658 \cdot 10^{-23}$ J K^{-1} and T the temperature of the body in kelvin.

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A DO block generates wavelength values from 0 to 4 μm in steps of 0.01 μm. A CONST block provides the black body temperature of the Sun. The PLANCK block calculates the spectral distribution, which is attenuated by the dilution factor 46200.

The PLOT block displays the solar spectrum outside atmosphere.

