Evans/Morris red shifts from the Planck distribution in broad band and atomic spectra

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(www.webarchive.org.uk, www.aias.us,
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3 Numerical analysis and graphics

The formulas for optical absorption have been given by Eqs.(15-31) of section 2. Here we present an example to show the properties graphically. We use a simple Debye model for a liquid in the far infrared frequency range. the parameters were selected as follows:

$$\omega_0 = 1.0 \cdot 10^{10} \text{ /s} \tag{45}$$
$$\tau = 1.0 \cdot 10^{-10} \text{ s} \tag{46}$$
$$\epsilon_0 = 8 \tag{47}$$
$$\epsilon_\infty = 1 \tag{48}$$

The results for real and imaginary parts of permittivity ϵ and refraction index n are graphed in Figs. 1 and 2 and look similar. The Debye plateau is visible which is an artifact of the model and should be replaced by a memory function. We kept it here for demonstration purposes. Fig. 3 shows the absorption coefficient α which is quite large. The velocity components (Fig. 4) start with a zero imaginary part at $\omega = 0$. The modulus stays below the velocity of light in vacuo ($3 \cdot 10^8$ m/s). The photon mass (Fig. 5) depends on frequency as expected and is in the range of 10^{-41} kg. The last diagram (Fig. 6) shows the decrease of frequency in dependence of the sample length L. Due to the high absorption coefficient α, the frequency falls down within some Angstroms significantly, indicating a strong absorption in this kind of fluid modelled.

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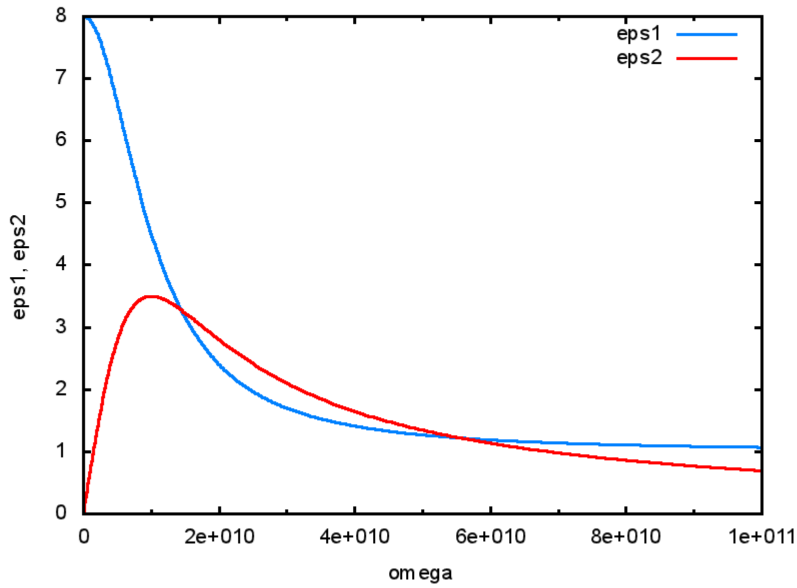

Figure 1: Frequency dependency of $\epsilon_1(\omega)$, $\epsilon_2(\omega)$.

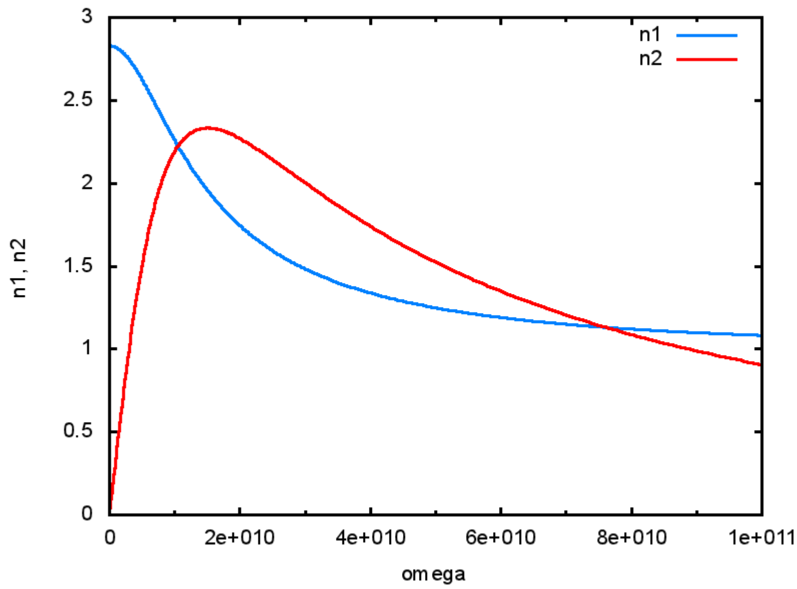

Figure 2: Frequency dependency of $n_1(\omega)$, $n_2(\omega)$.

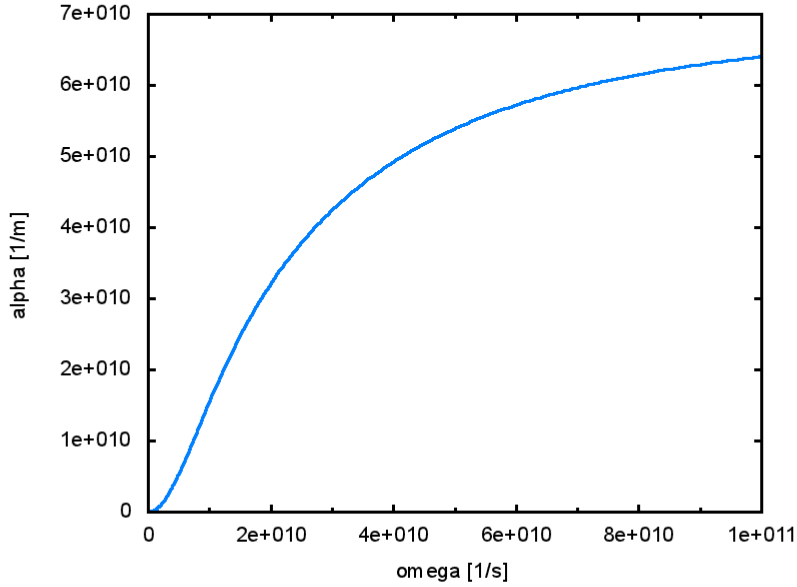

Figure 3: Frequency dependency of absorption coefficient $\alpha(\omega)$.

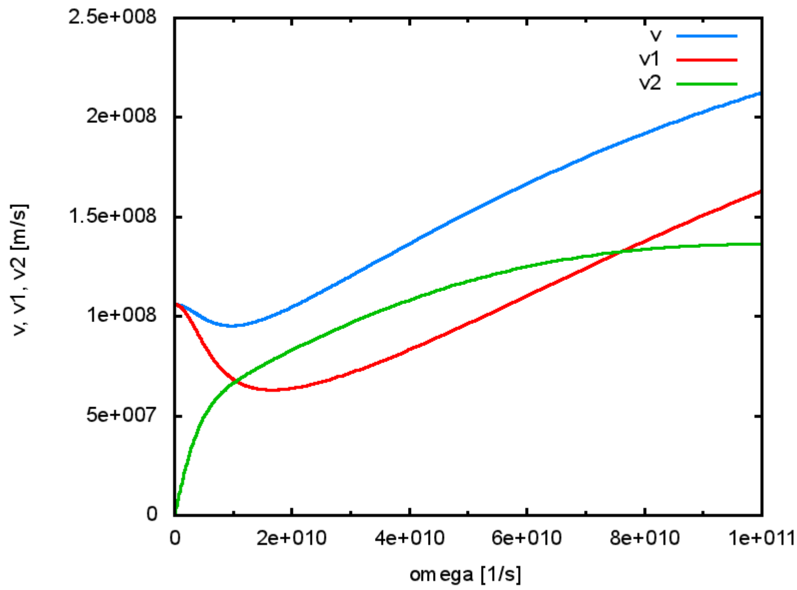

Figure 4: Frequency dependency of velocity components $v_1(\omega)$, $v_2(\omega)$ and absolute value $v(\omega)$.

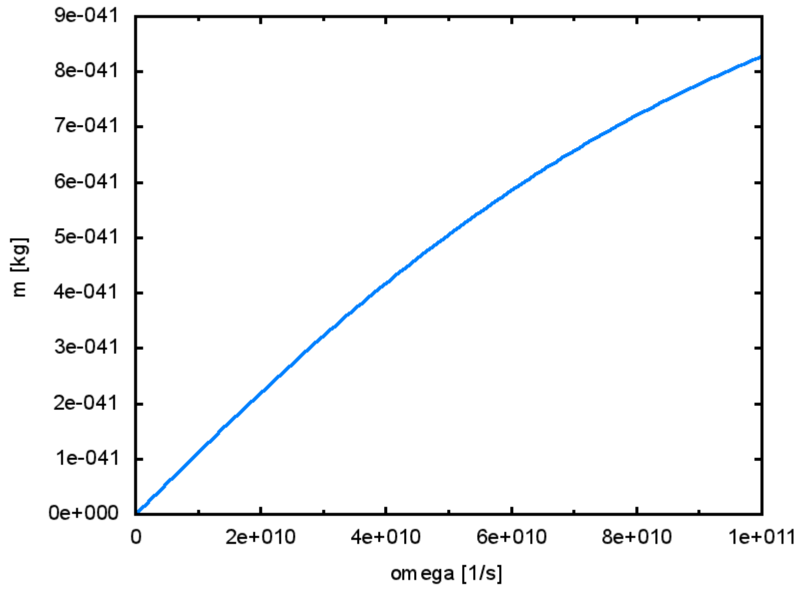

Figure 5: Frequency dependency of photon mass $m(\omega)$.

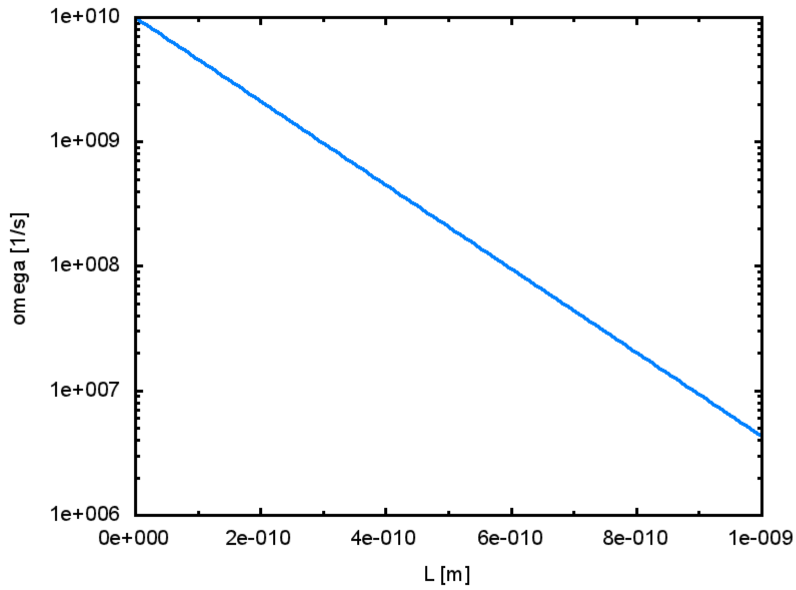

Figure 6: Sample length dependency of frequency red-shift on ω.