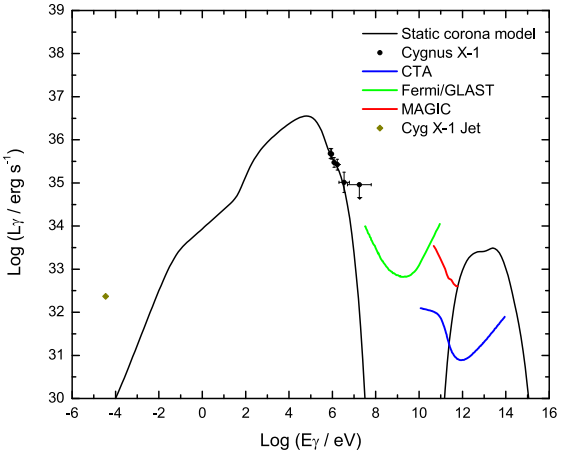

Fig. 1. Spectral energy distribution obtained with the steady state model of a static corona. The model fits well the soft gamma-ray emission measured by COMPTEL of Cygnus X-1 (McConnell et al. 2000). The non-thermal radio emission from the jet is also shown (Stirling et al. 2001).

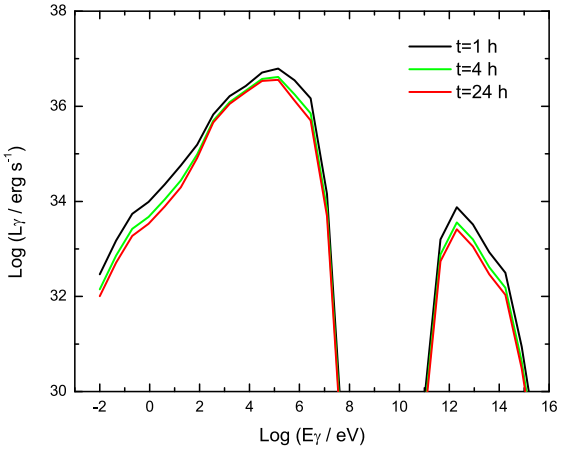

Fig. 2. SED evolution during the flare.

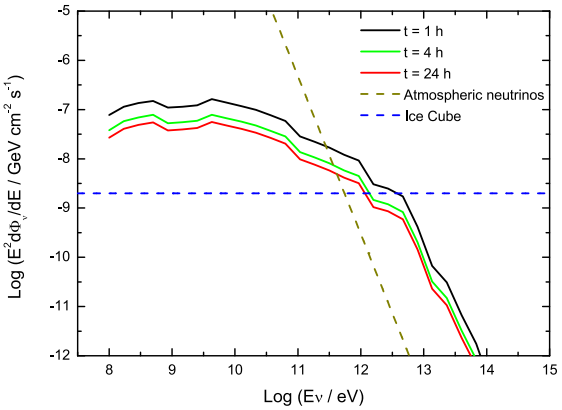

Fig. 3. Neutrino flux and atmospheric neutrinos.

Decay) behavior, whereas the energy dependence is a power-law with an index of $\alpha = 2.2$.

In order to estimate the electromagnetic emission, the particle distributions $N(E,t)$ ought to be known. These can be derived from the solution to the transport equation (Ginzburg & Syrovatskii 1964)

$$\frac{\partial N(E,t)}{\partial t} + \frac{\partial}{\partial E}\Big(b(E)N(E,t)\Big) + \frac{N(E,t)}{t_{\rm esc}} = Q(E,t). \quad (1)$$

where $b(E) = \frac{dE}{dt}\Big|_{\rm loss}$.

Figure 2 shows the evolution of the total luminosity. As it can be seen from the figure, the final SED does not change its shape as the flare evolves.

We also estimate the neutrino output; we consider neutrino injection by charged pion and muon decay. The differential flux of neutrinos arriving at the Earth can be seen in Figure 3.

4. DISCUSSION

According to our results, a cumulative signal from recurrent neutrino bursts might be detectable in accreting black holes (few years of integration for duty cycles of about ten percent). The electromagnetic part of the flare can also be detectable at some energies, depending of the optical depth for photon annihilation.

The effect of the presence of the photon field of the star is also relevant. The photon absorption due to this field depends on the position of the black hole in its orbit, and the electromagnetic output is different for flares starting at different orbital phases (Vieyro & Romero 2011, in preparation).

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