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## Spectra and light curves of the radiative reprocessing in a stable envelope

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The radiation reprocessing model, in which an optically-thick layer absorbs the high-energy emission from a central source and re-emits in longer wavelengths, has been frequently invoked to explain some optically bright transients such as tidal disruption events (TDEs). Previous studies on this model did not take into account either changing the envelope mass and the input luminosity or the frequency-dependent opacity. We study the radiative reprocessing in a steady-state and spherical envelope composed of pure hydrogen gas with the different envelope mass and the input luminosity. Frequency-dependent bound-free, free-free and electron scattering opacities are considered.

We present the numerical results of the emitted optical luminosity and soft X-ray luminosity with the different envelope mass and input luminosity. The results show that with the increase of the envelope mass, the soft X-ray luminosity will be lower and the optical luminosity will be higher. The results also show that the higher the input luminosity, the higher the soft X-ray luminosity, while the optical luminosity is almost constant. We apply our model to the optically bright TDEs: ASASSN14-li, ASASSN15-oi, and the X-ray bright TDEs: SDSS J120136.02+300305.5 XMMSL1 J061927.1-65531.

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