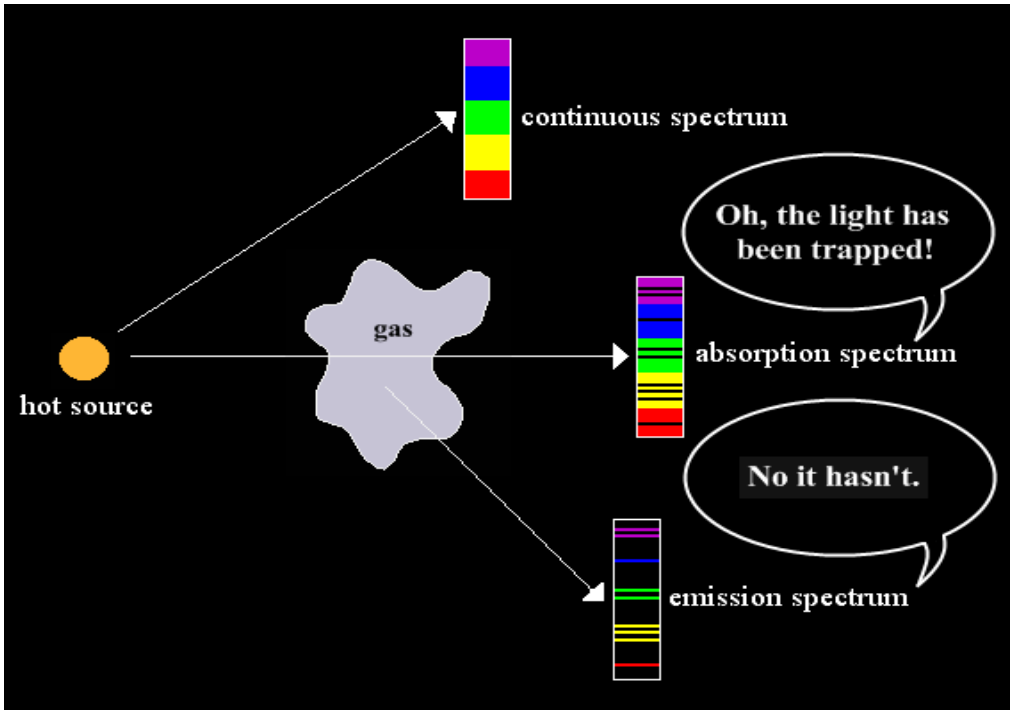
Absorption and emission

Let's look at Kirchhoff's Laws.

Relative to the observer, an absorption spectrum signifies that a cooler gas is in front of a warmer (therefore brighter) body. This very fact alone proves that the cooler gas isn't heating the warmer body, i.e., the earth. I must say 'relative to the observer,' of course, because from another angle of view, an observer will notice that the "missing" wavelengths "absorbed" by this cooler gas are radiating from it, creating an EMISSION spectrum. No energy is trapped, then.

What is being captured is simultaneously being released.



Here's the trick: A previously heated object will naturally cool down if left alone. One cooling mechanism is of course radiation. In that sense, then, "radiative cooling" is a legitimate concept, although it's a minor component compared to conductive and convective cooling. This is why a spacecraft has such a hard time dumping internal heat to the surrounding vacuum: radiative cooling is a sluggish process. But a constantly illuminated body that is radiating in response is NOT cooling down. A simple thermometer will verify that. If this body is a blackbody, for example, its molecules are vibrating in 100% correspondence to the energy they're absorbing, and this vibration is CAUSING the electromagnetic energy they emit. Cutting off this outgoing energy, then, will not make the ***incoming energy*** vibrate those molecules vibrate any MORE. This is why the suppression of "radiative cooling" does not raise a body's temperature.

As I say, hot coffee in a thermos has a lot of lessons to teach.

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