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Two Photon Abosorbtion

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Single photon absorption is the process when an atom absorbs a photon whose energy is equal to the atoms next closest energy level. Two photon absorption however is when an atom absorbs any two photons whose energy sums up to the transition energy. The study of two photon absorption has multiple applications in several fields of physics. One area which has not been completely explored is its applications to astrophysics, particularly its application as a correction to the spectroscopy at cosmological distances. Hydrogen is the most abundant element in the universe and is therefore likely the biggest contributor to see how many photons in an emitted radiation field are lost to two photon absorption, in the immense distance traveled from a distant stars to ours. Although the absorption coefficient for such low intensity radiation is mostly insignificant, over such a huge distance it could contribute a significant correction to the radiation field. We will present calculations of the two photon absorption coefficient of hydrogen for low intensity radiation fields and show its application as a correction to said radiation field.

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