

## 5.1: Introduction

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As radiation struggles to make its way upwards through a stellar atmosphere, it may be weakened by *absorption* and *scattering*. The combined effect of absorption and scattering is called *extinction*. Scattering may simply be by reflection from dust particles. If the radiation interacts with an *atom*, the atom may be excited to a higher energy level and almost immediately (typically on a time-scale of nanoseconds) the atom drops down to its original level and emits a photon of the same frequency as the one it absorbed. Such a process - temporary absorption followed almost immediately by re-emission without change in wavelength - is probably best described in the present context as scattering. Individual atoms in a stellar atmosphere generally radiate dipole radiation; however, since many randomly oriented atoms take place in the process, the scattering can be regarded as isotropic. If, however, the excited atom collides with another atom before re-emission, the collision may be super-elastic; as the atom falls to a lower state, the energy it gives up, instead of being radiated as a photon, goes to kinetic energy of the colliding atoms. The radiation has been converted to kinetic energy. This process is absorption.

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