


Astro 220: Galaxies and cosmology

Nov 1 2010

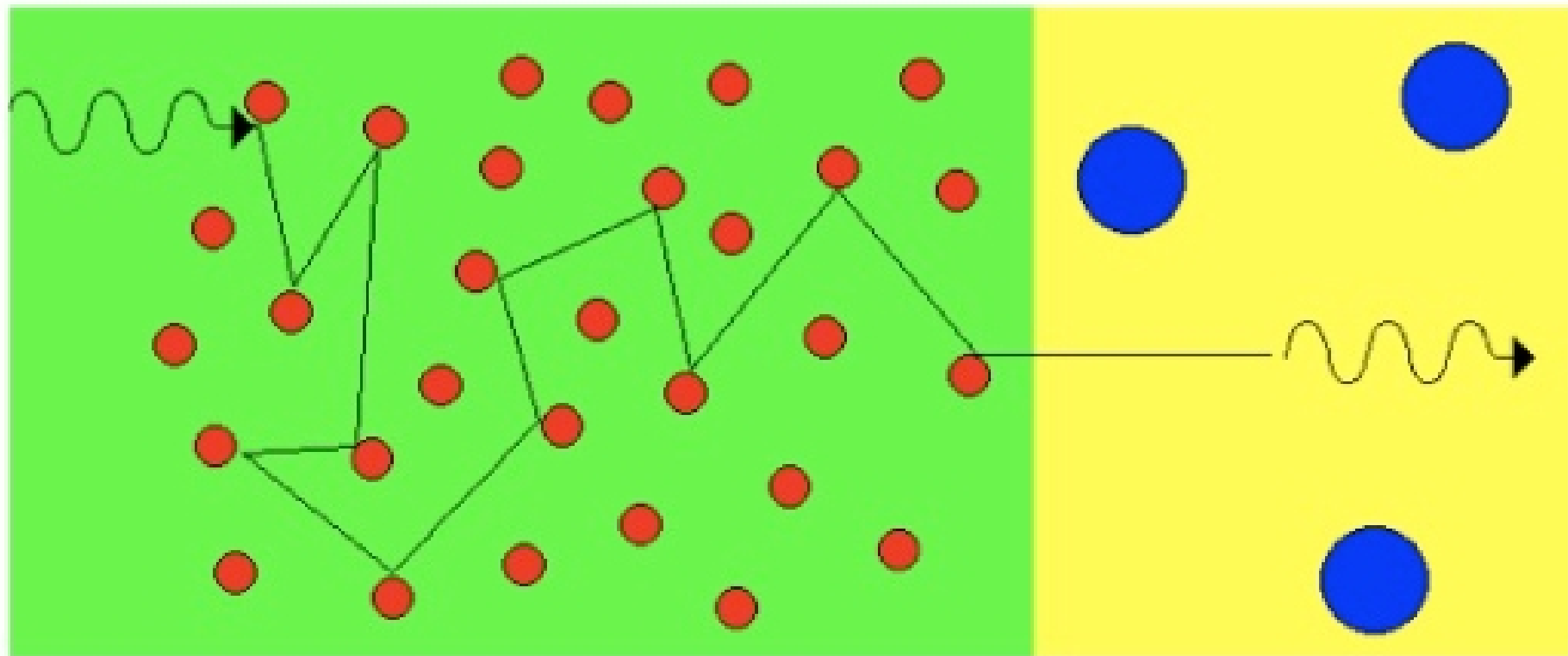
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Last Scattering Epoch

As the Universe cooled, the free electrons and protons could finally bond together to form hydrogen atoms. At the same time, the Universe went from a rich plasma to a gas of neutral hydrogen.



hydrogen plasma

atomic hydrogen

In a plasma, the mean free path of a photon is very short. In a gas of atomic hydrogen, the mean free path is very long, as long as the size of the Universe. Thus, the transition from the early plasma to atomic hydrogen is the epoch of last scattering, the point in time when the photons became free to travel without hindrance.