

THE INTERACTIONS

(19)

- defined by the kernel $k(\vec{u}, \lambda, \vec{w}; \lambda')$
- photon-photon interactions (neglecting electron production)

$$\bullet k(\vec{u}, \lambda, \vec{w}; \lambda') \rightarrow \frac{d\sigma}{d\vec{w} d\lambda}$$

Then

$$\sigma(\vec{w}, \lambda') = \int d\vec{u} \int d\lambda k(\vec{u}, \lambda, \vec{w}; \lambda') \quad (13)$$

is the scattering coefficient for the given process.

- We will consider three types of interactions

photoelectric effect τ

scattering Rayleigh σ_R

scattering Compton σ_C

- For energies between 1 and 100 keV the main interactions are these, therefore

$$\underline{\mu} = \tau + \sigma_R + \sigma_C$$

└ total attenuation coefficient

Elementary X-Ray effects

(20)

Type of effect	Absorption	Scattering	
		Elastic	Inelastic
Carrier			
Atomic electrons	Photoelectric effect	Rayleigh scattering scattering dispersion	Compton scattering
Electron-positron field	Pair production	Delbrück scattering	
Nucleons	Photoneuclear (γ, n), (γ, p), etc	(γ, γ) Low energy limit: Thomson scattering	(γ, γ)'
Mesons	Photomeson production	Modified (γ, γ)	