Photon Escape Fraction

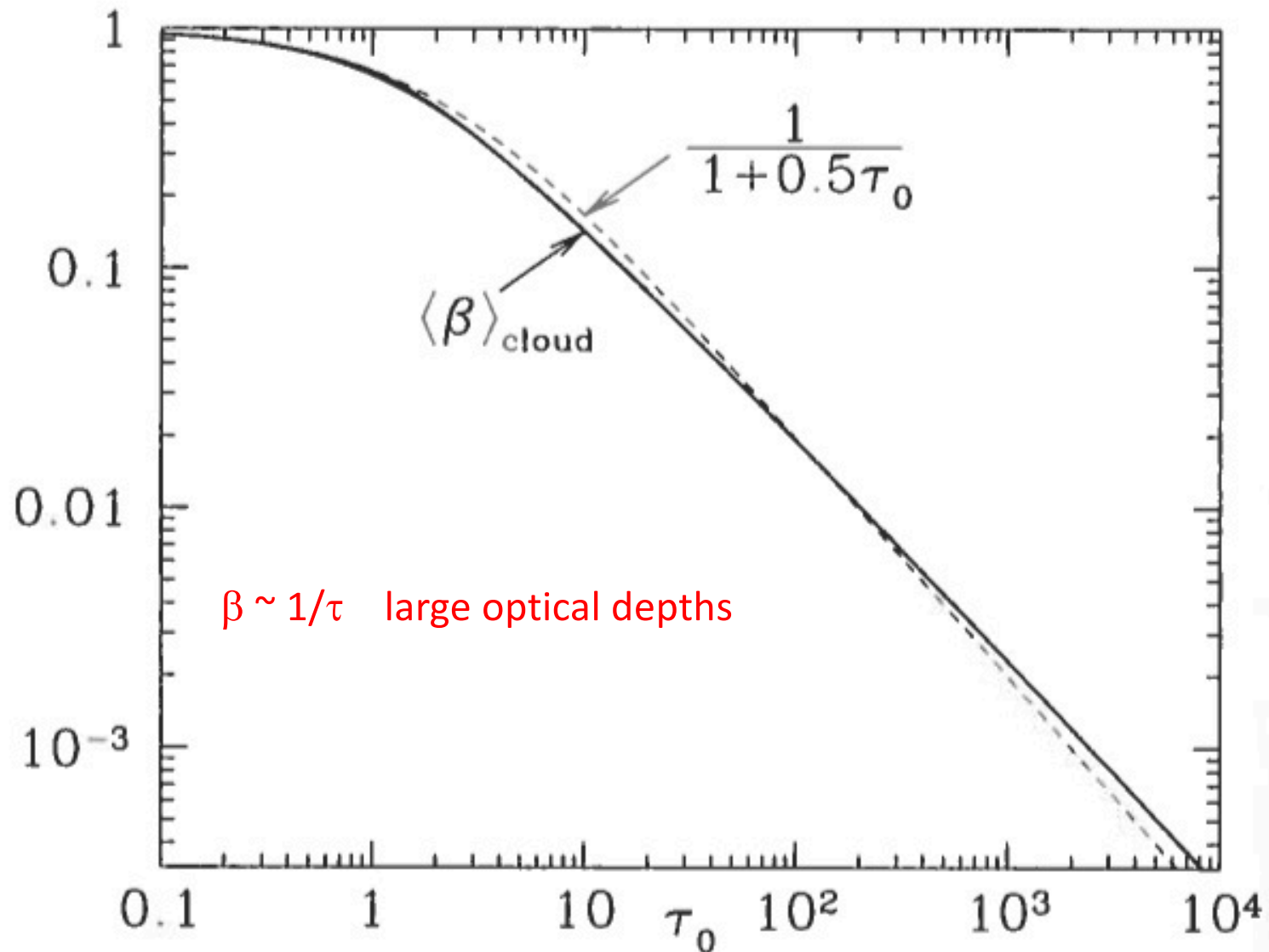**Figure 19.1** Average escape probability $\langle\beta\rangle_{\rm cloud}$ for a homogeneous spherical cloud. τ_0 is the line-center optical depth from the center of the cloud to the surface.

Formulae for Different Geometries

$$\beta = \frac{3}{2\tau}\left(1 - \frac{2}{\tau^2} + \left(\frac{2}{\tau} + \frac{2}{\tau^2}\right)e^{-\tau}\right)$$

Static, uniform density sphere

$$\beta = \frac{(1 - e^{-3\tau})}{3\tau}$$

Static, uniform density slab

$$\beta = \frac{(1 - e^{-\tau})}{\tau}$$

Large Velocity Gradient v ~ r (Sobolev Approx.)