

Intrinsic image model was introduced by **intrinsic-image**. It represents that an image I can be decomposed as the element-wise product between the reflectance R of the object and the shading S produced by the interaction between light and objects.

$$I = R \odot S$$

The equation can be further decomposed based on different surface models. If assume the object surfaces are Lambertian surfaces, i.e. the diffuse surfaces, the equation can be decomposed further as follows

$$I = \rho \odot (L_0 \mathbf{L} \cdot \mathbf{N})$$

where ρ is the reflectance of diffuse surface, also know as albedo, L_0 is the radiance of incoming light, i.e. irradiance, \mathbf{L} is the direction of incoming light as unit vector map and \mathbf{N} is the surface normal also as unit vector map.

As shown in Figure 1, According to the Lambertian reflectance model, the

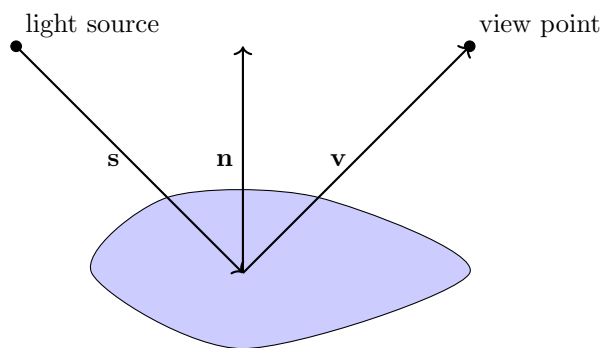


Figure 1: Lambertian Surface

relationship between image and the surface model is

$$I = \rho(\mathbf{N} \cdot \mathbf{L})$$

where I is the total power , ρ is the albedo, N is the normal map and L is the incoming light direction.