Physical Rendering

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1 Measurements

1.1 Radiant Flux

The radiant flux (or power) Φ is the total amount of energy passing through a surface per second and is measured in $[W]$ (watts) as $\frac{J}{s}$.
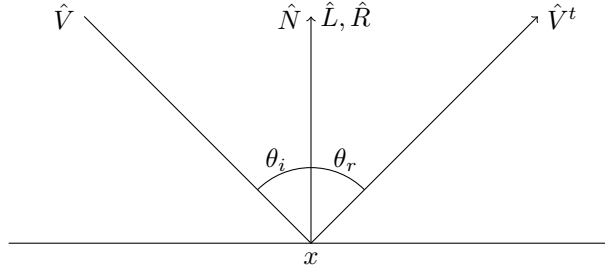
1.2 Irradiance

The irradiance E is the measurements of the radiant flux per *unit area* and is measured in $[W][M]^{-2}$ as $\frac{\Phi}{m^2}$.

1.3 Radiance

The radiance L is the irradiance per unit solid angle (steradian) and is measured in $[W][M]^{-2}[M]^{-2}[sr]^{-1}$ as $\frac{E}{sr}$.

2 Terminology

- $\hat{V}$ direction torwards the camera
- $\hat{N}$ surface normal
- $\hat{L}$ vector pointing torward the light source
- $\hat{R}$ reflected ray direction
- θ_i, θ_r incident and reflected angles

$\hat{R} = \hat{L} - 2\hat{N}(\hat{L} \cdot \hat{N})$

3 Rendering equation

The rendering equation tells us how much light is exiting a *surface point* in a given direction

References

[1] K'aroly Zsolnai-Feh'er. *TU Wien Rendering Course*. https://users.cg.tuwien.ac.at/zsolnai/gfx/rendering-course/. 2018.