

Photon Map GI

Page Contents

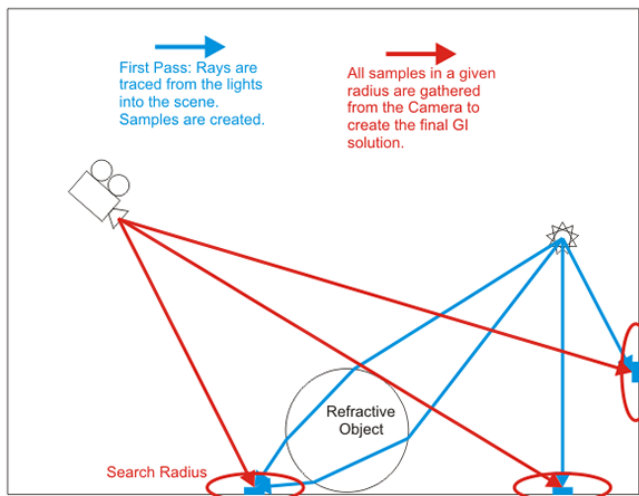
- [Overview](#)
- [Photon Map Settings](#)

Overview

The global photon map is somewhat similar to the irradiance map in that it is a collection of points in 3D space (a point cloud). The photon map is built by tracing particles (photons) emitted by the scene lights. Those photons bounce around the scene and hit various surfaces, and the hit points are stored in the photon map.

Reconstructing the illumination from the photon map is accomplished through estimation of the photon density at a given point. V-Ray can use several methods for density estimation, each with its own advantages and disadvantages. Usually these methods are based on looking for the photons that are nearest to the shaded point.

Note that in general, the photon map provides a less accurate approximation of the scene illumination than other methods, especially when it comes to small details.



A major disadvantage of the photon map method is boundary bias, where areas around corners and object edges appear darker than they should be. Other methods can also show boundary bias, but can be adapted to decrease the effect greatly. Another disadvantage of the photon map is that it cannot simulate illumination from skylight because the photons need an actual surface to be emitted from. The skylight, at least in V-Ray, is not a surface actually present in the scene.

On the other hand, the photon map is view-independent and can be computed relatively quickly. This makes it ideal for quickly approximating the scene illumination when used together with more accurate methods like Brute Force or Irradiance map.

The above diagram shows the way the Photon Map is generated. In the first pass (blue) rays are traced from each light into the scene, which generates light samples across the entire scene. In the second pass (red) all samples in a specified radius are gathered from the camera in order to create the final GI solution.

Photon Map Settings

For more information about the Photon Map render Settings in V-Ray, please see the [Photon Map Settings](#) page within this documentation.