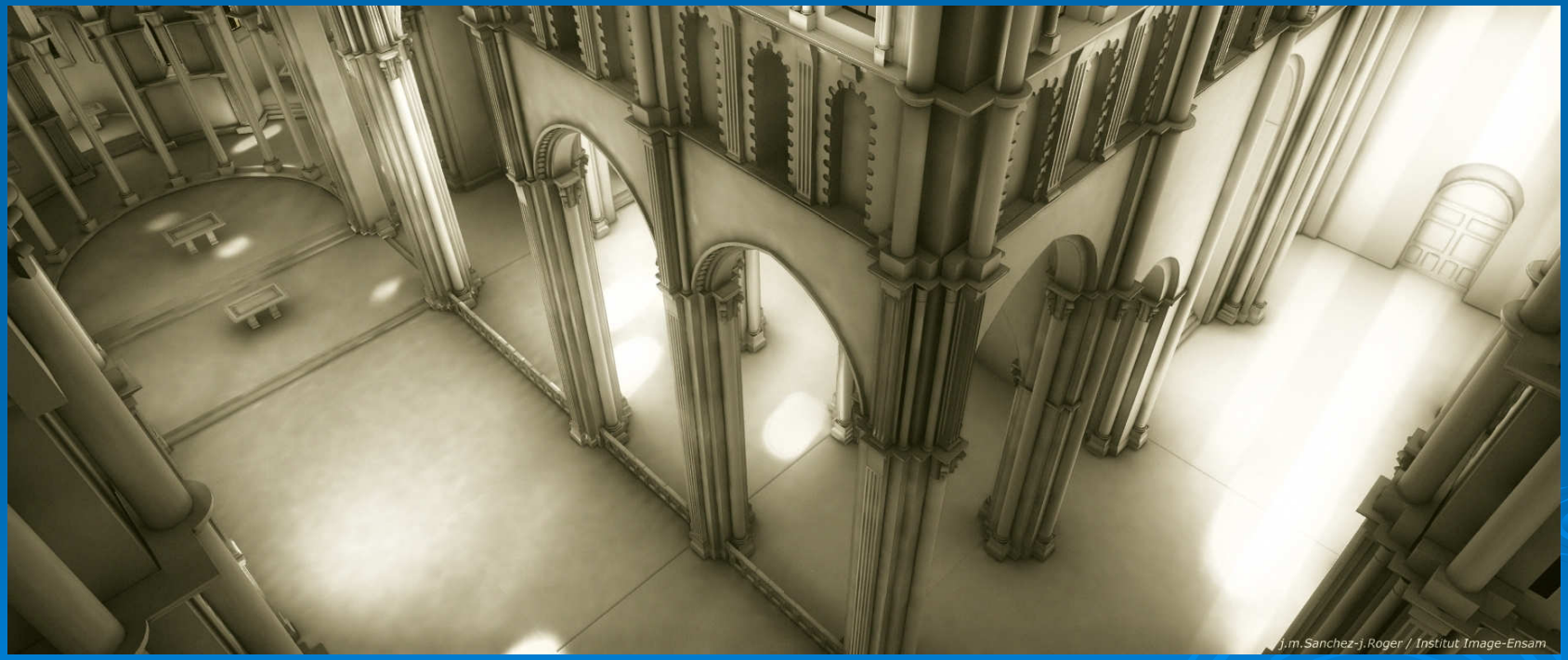
HDRI - 2
Illumination à base d'image



Thomas Muller

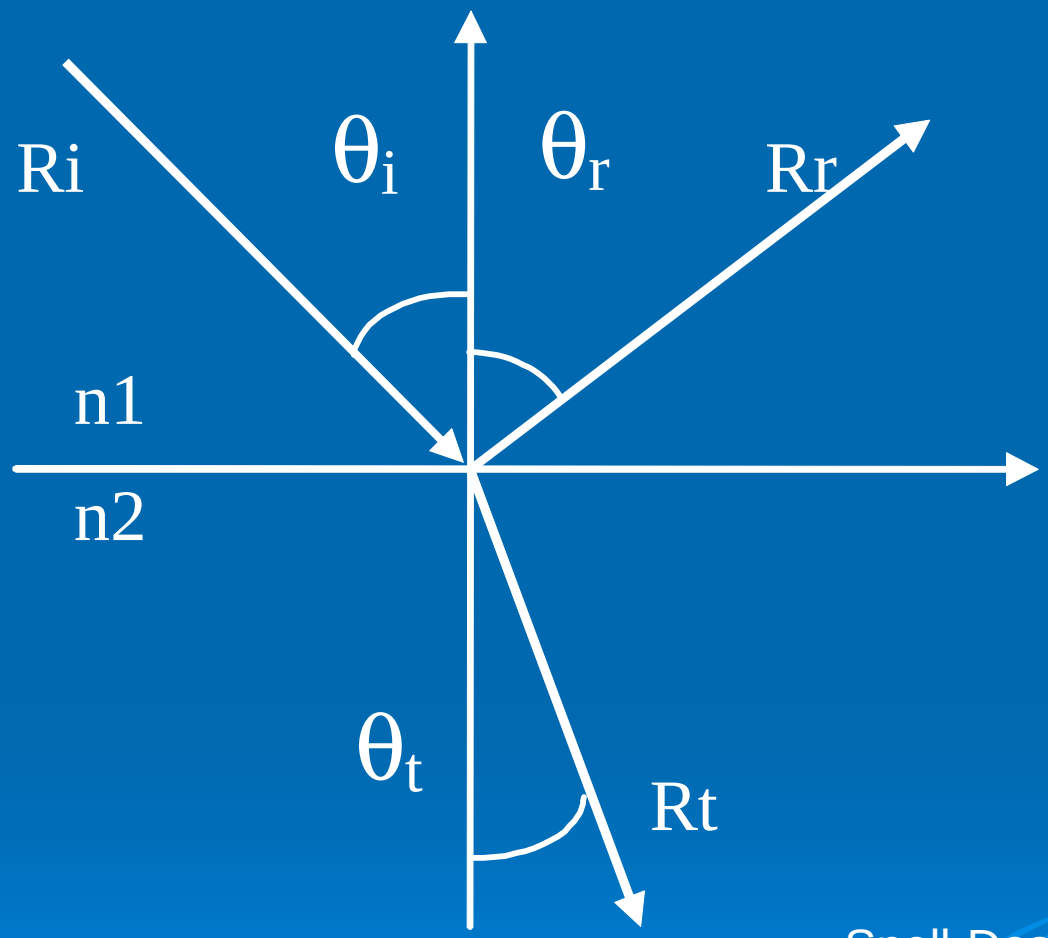
E.C.P. 2004/2005

Matière (Rappels)

BRDF

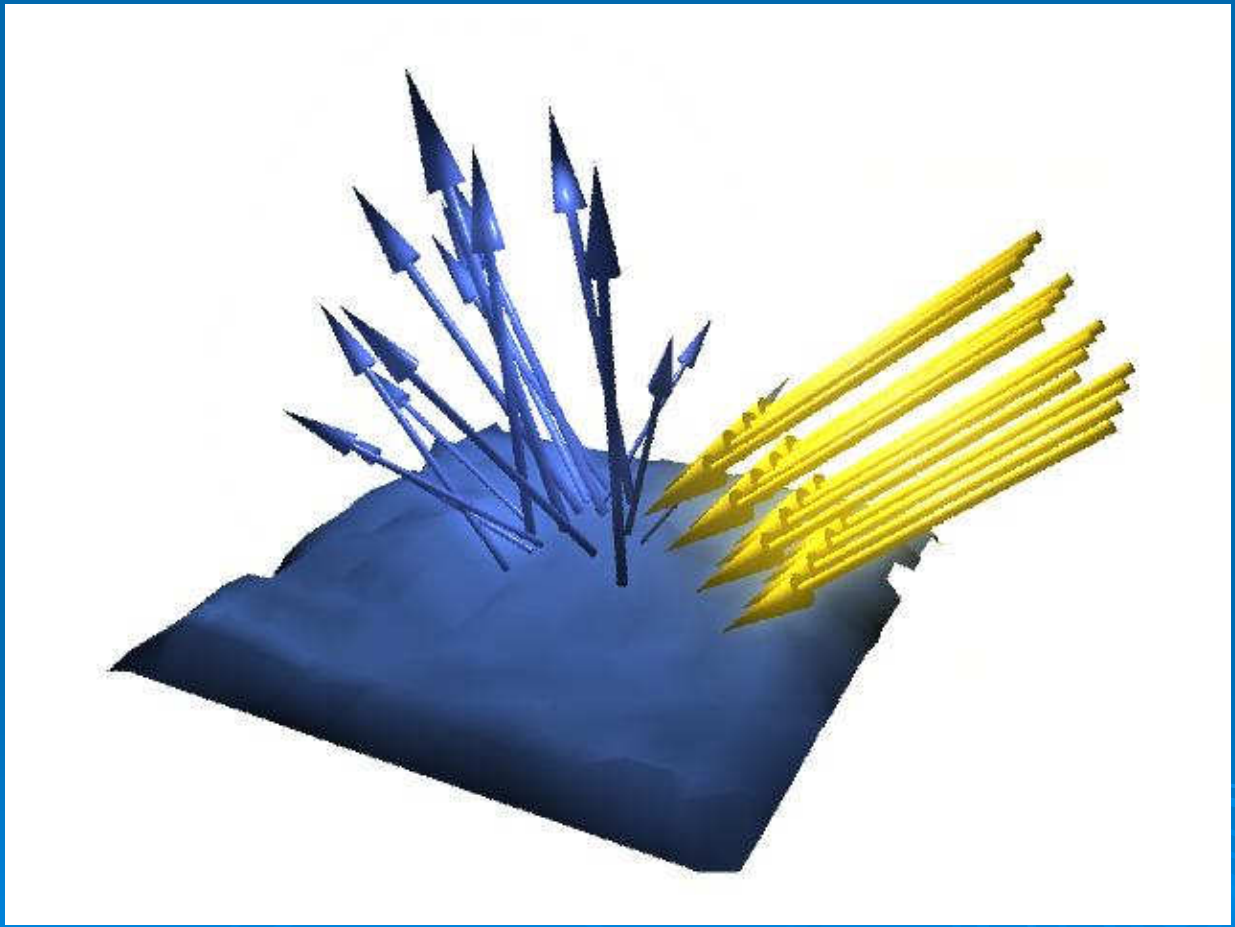
- Bidirectional Reflectance Distribution Function
- Fonction de distribution de la réflectance bidirectionnelle
- Décrit localement l'interaction lumière / matière

$$\rho_{bd}(x, \vec{\omega}_i, \vec{\omega}_r) = \frac{L_r(x, \vec{\omega}_r)}{E(x, \vec{\omega}_i)} = \frac{L_r(x, \vec{\omega}_r)}{L_i(x, \vec{\omega}_i).\cos\theta_i . d\omega_i}$$

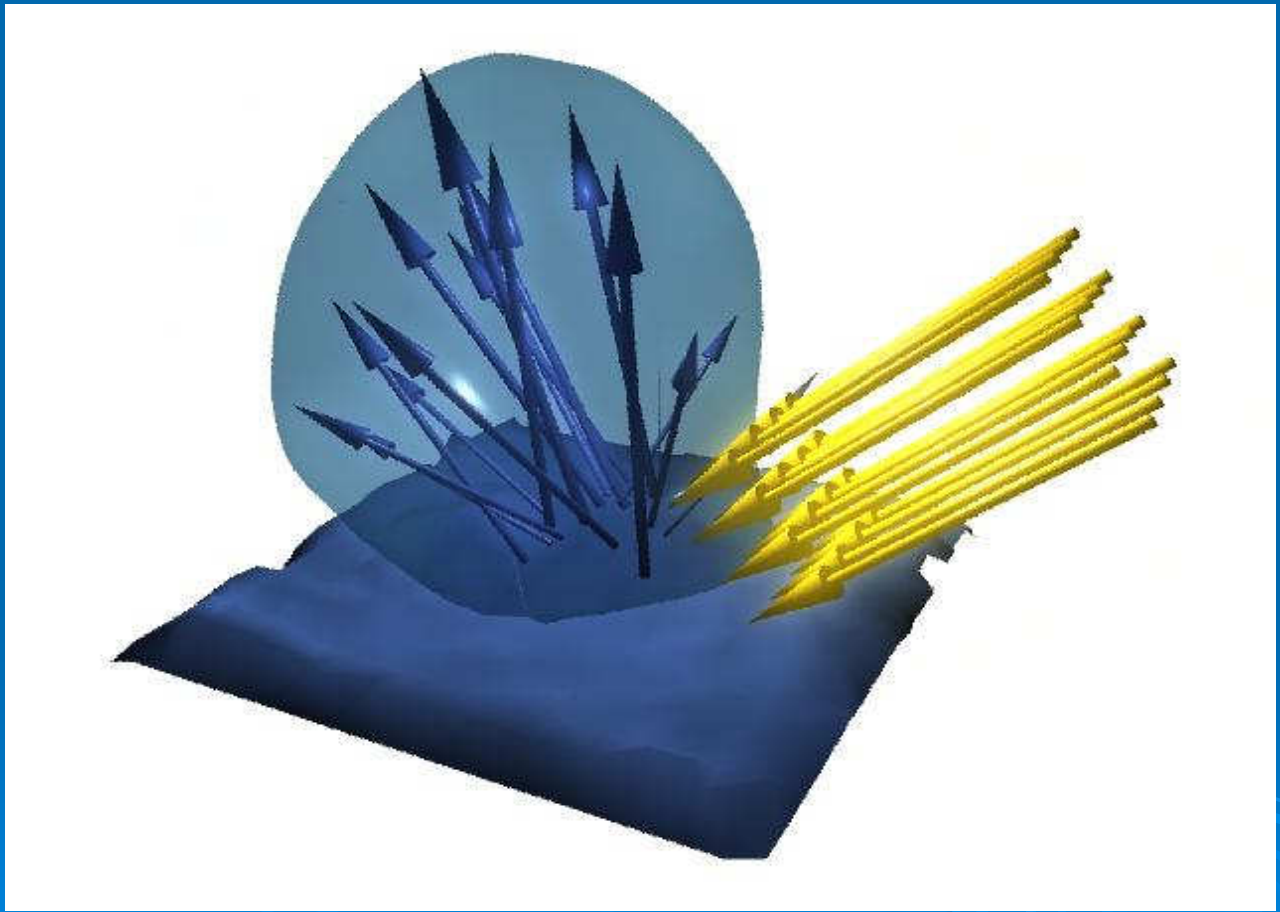


Snell-Descartes

BRDF – matériaux rugueux



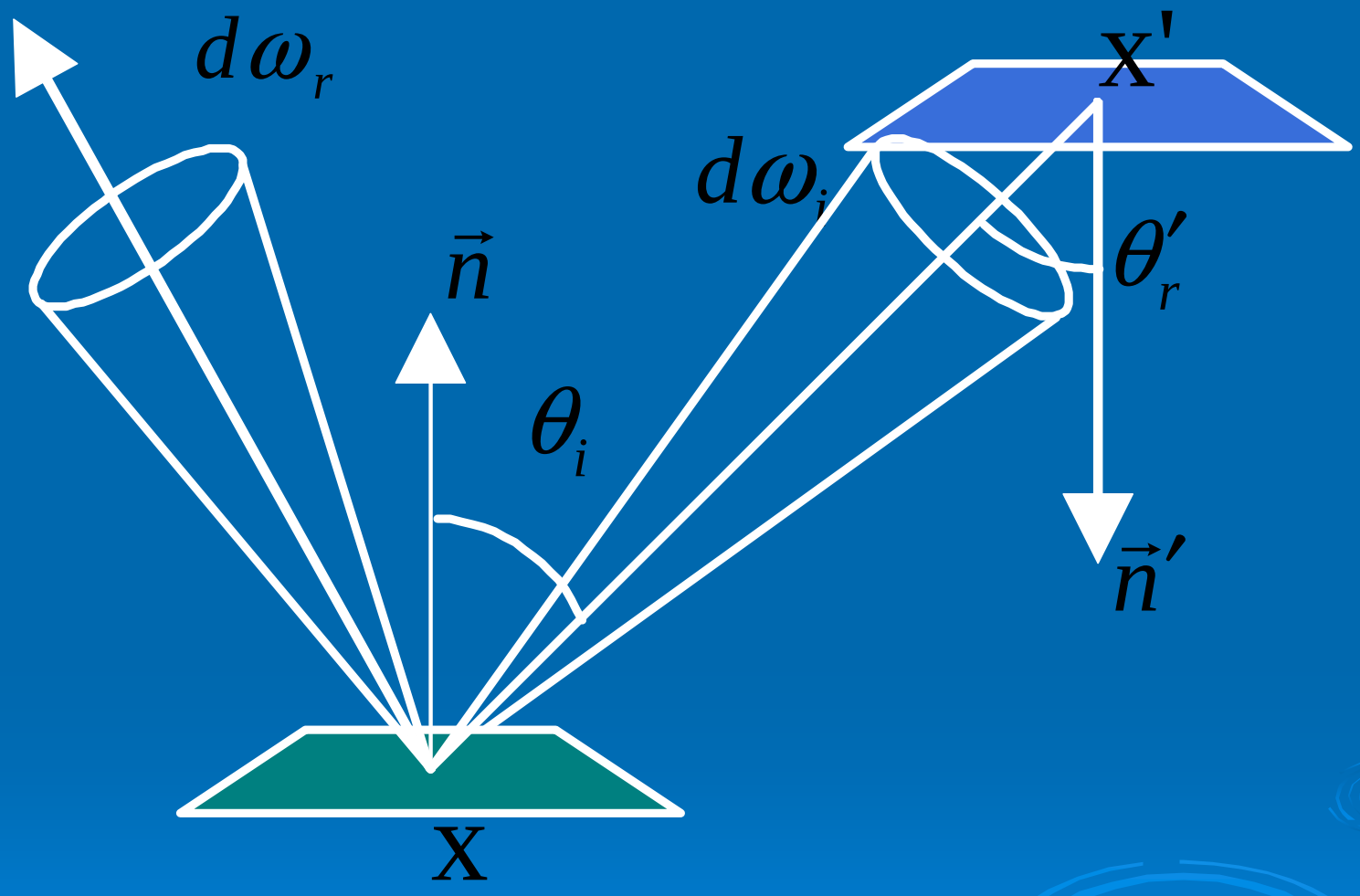
BRDF – matériaux rugueux



BRDF – lambertienne

Éclairage

E.C.P. 2004/2005


$d\omega_r$
x'
$d\omega_i$
$\vec{n}$
θ'_r
θ_i
$\vec{n}'$
x

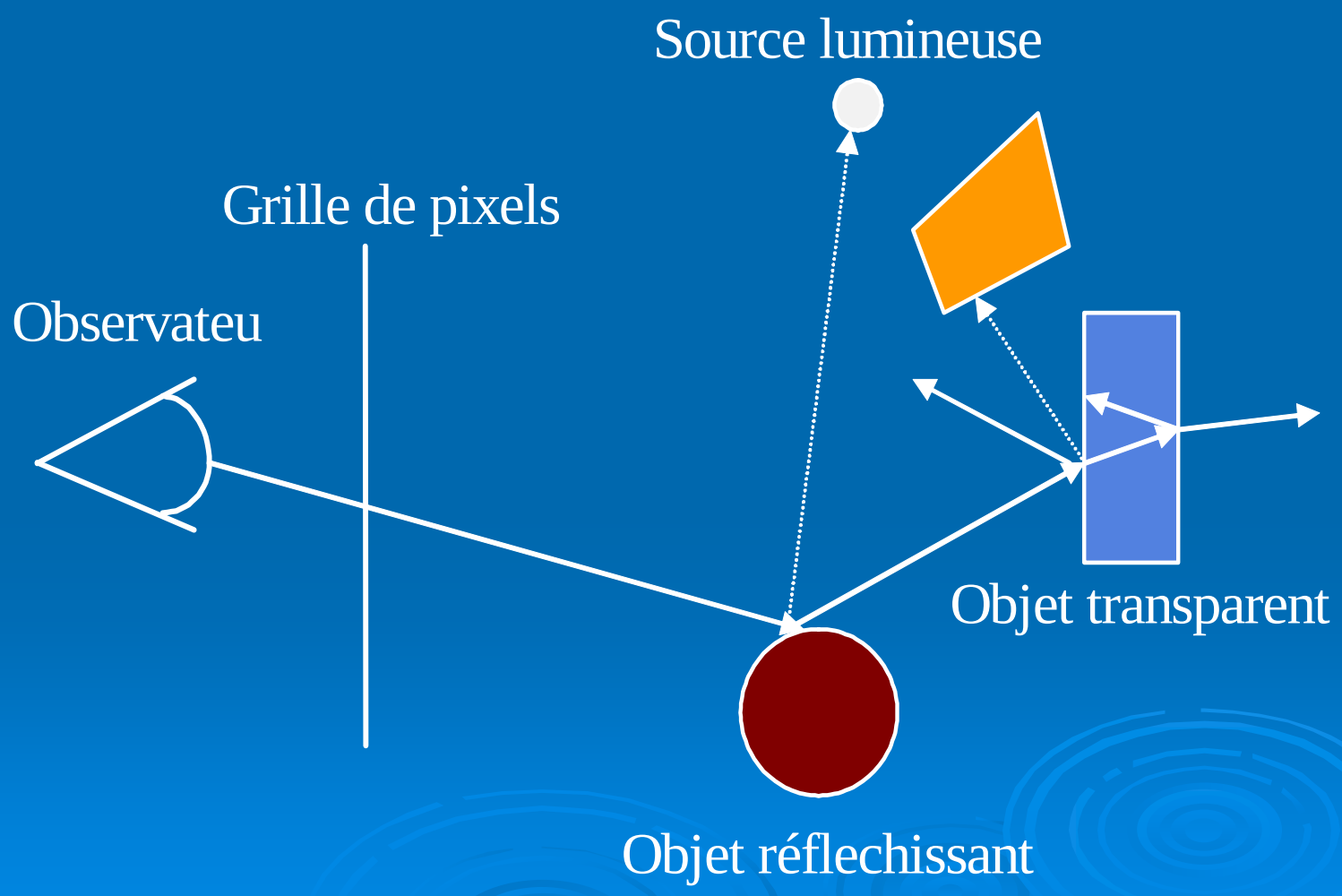
Lancer de rayon

$$L_r\left(x,\vec{\omega}_r\right)=$$

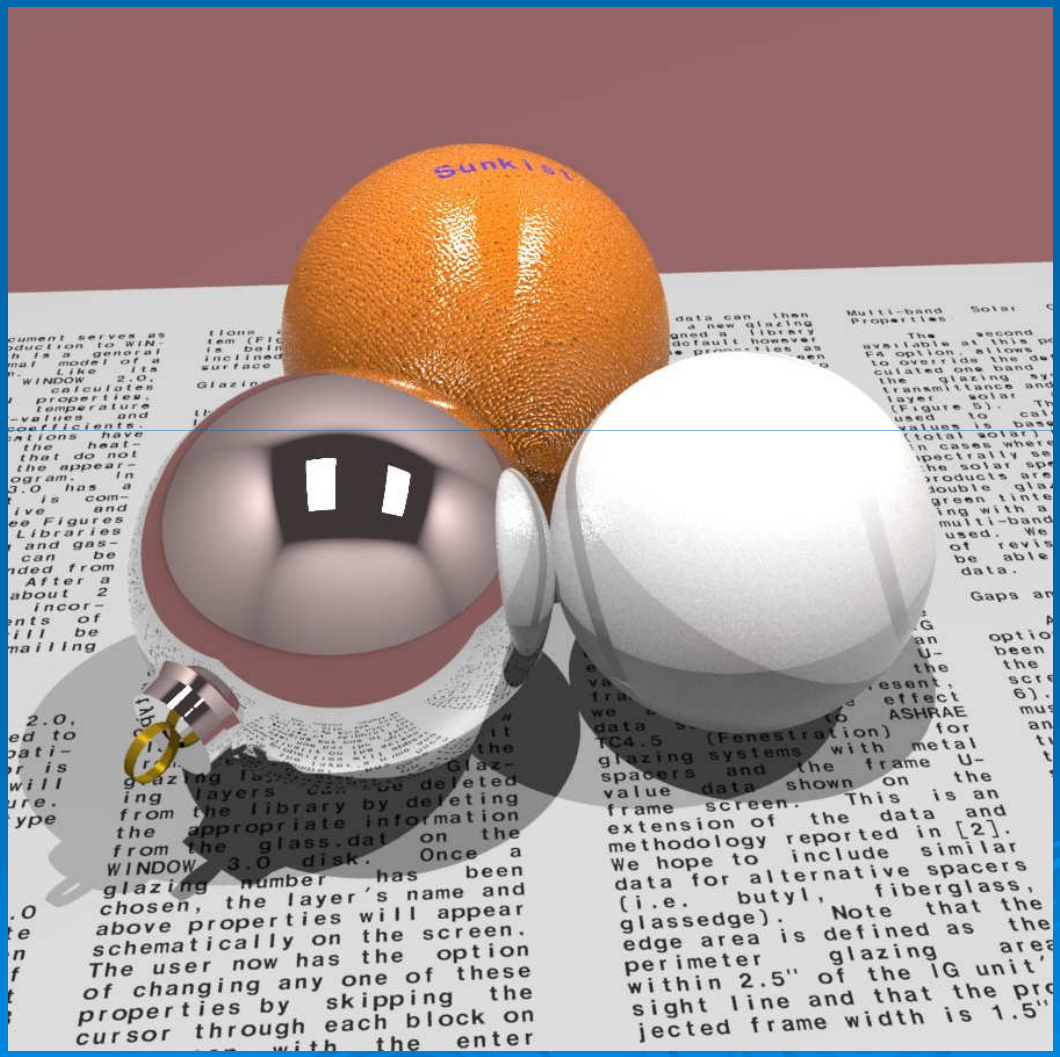
$$L_e\left(x,\vec{\omega}_r\right)\ +$$

$$\int_S \rho_{bd}\left(x,\vec{\omega}_I,\vec{\omega}_r\right).L_r\left(x',\vec{\omega}'_r\right).G(x,x')dxdx'$$

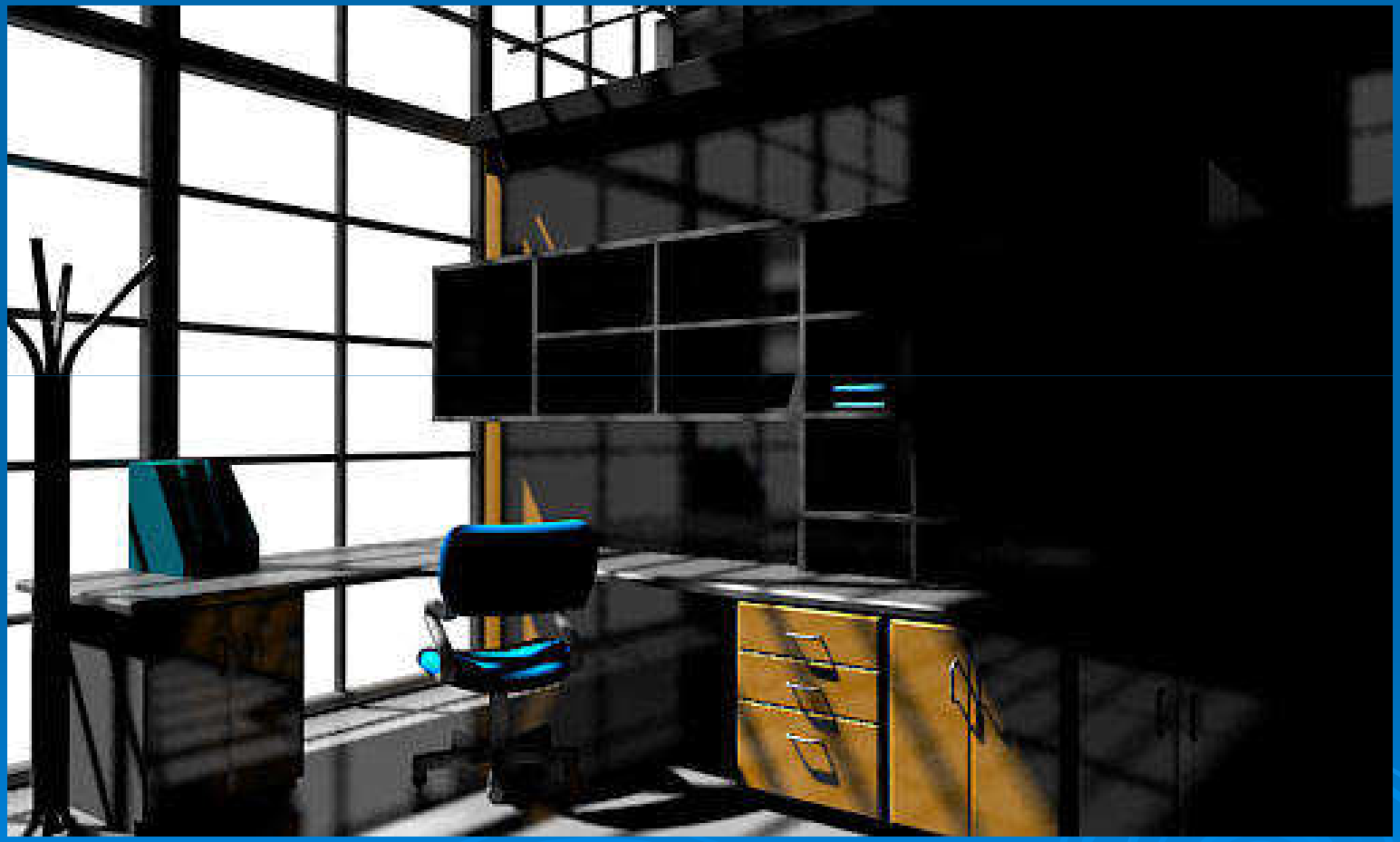
Lancer de rayon



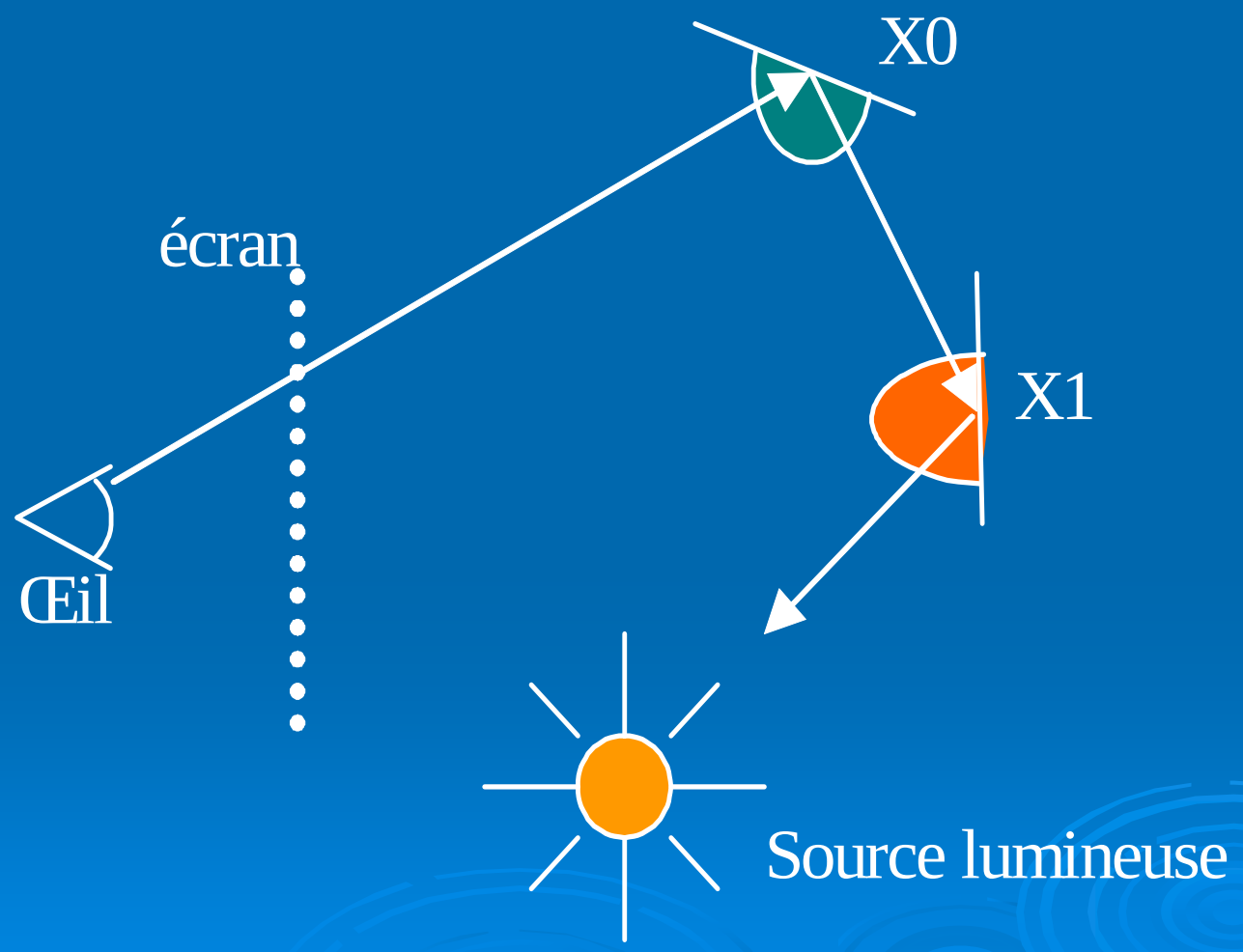
Lancer de rayon



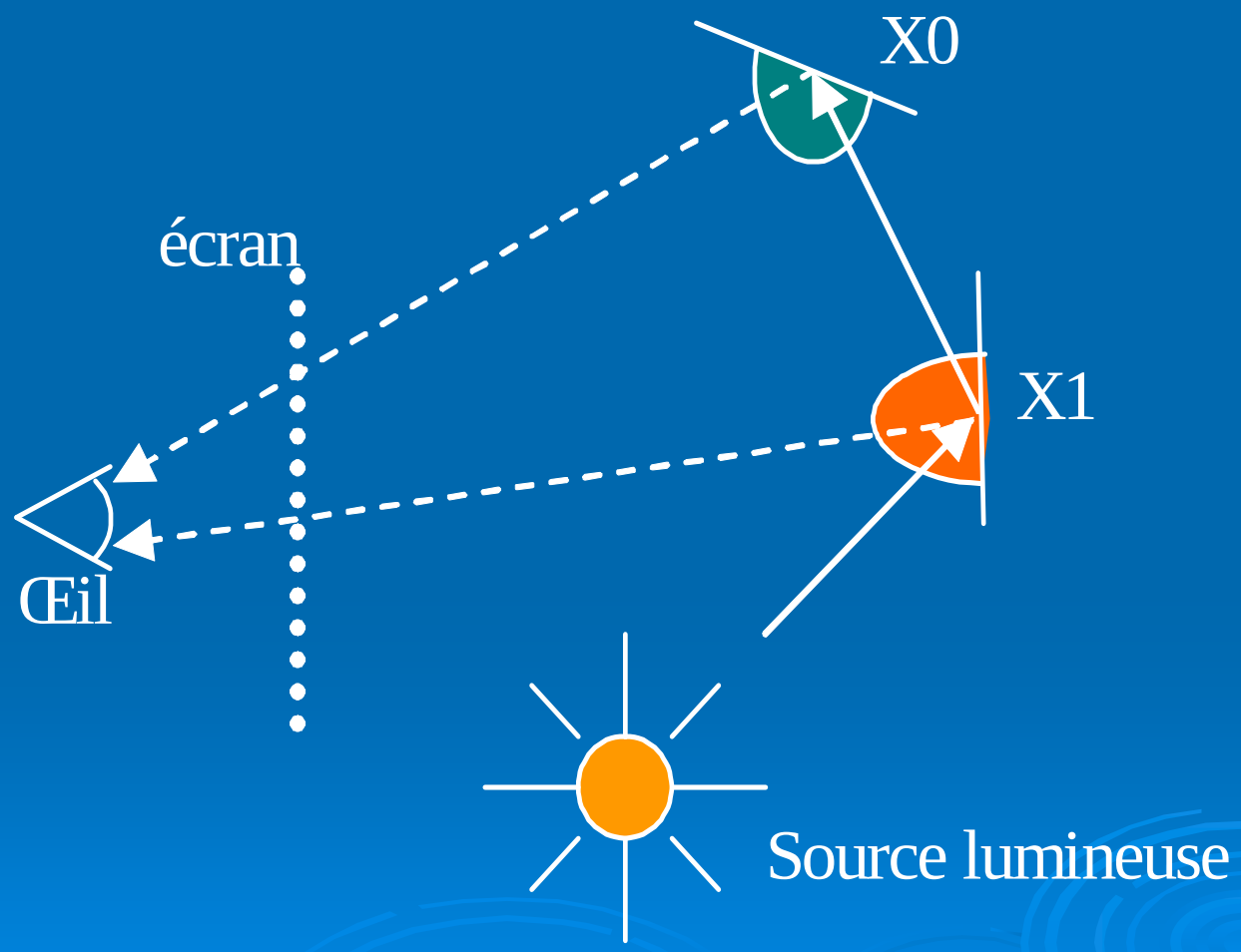
Lancer de rayon



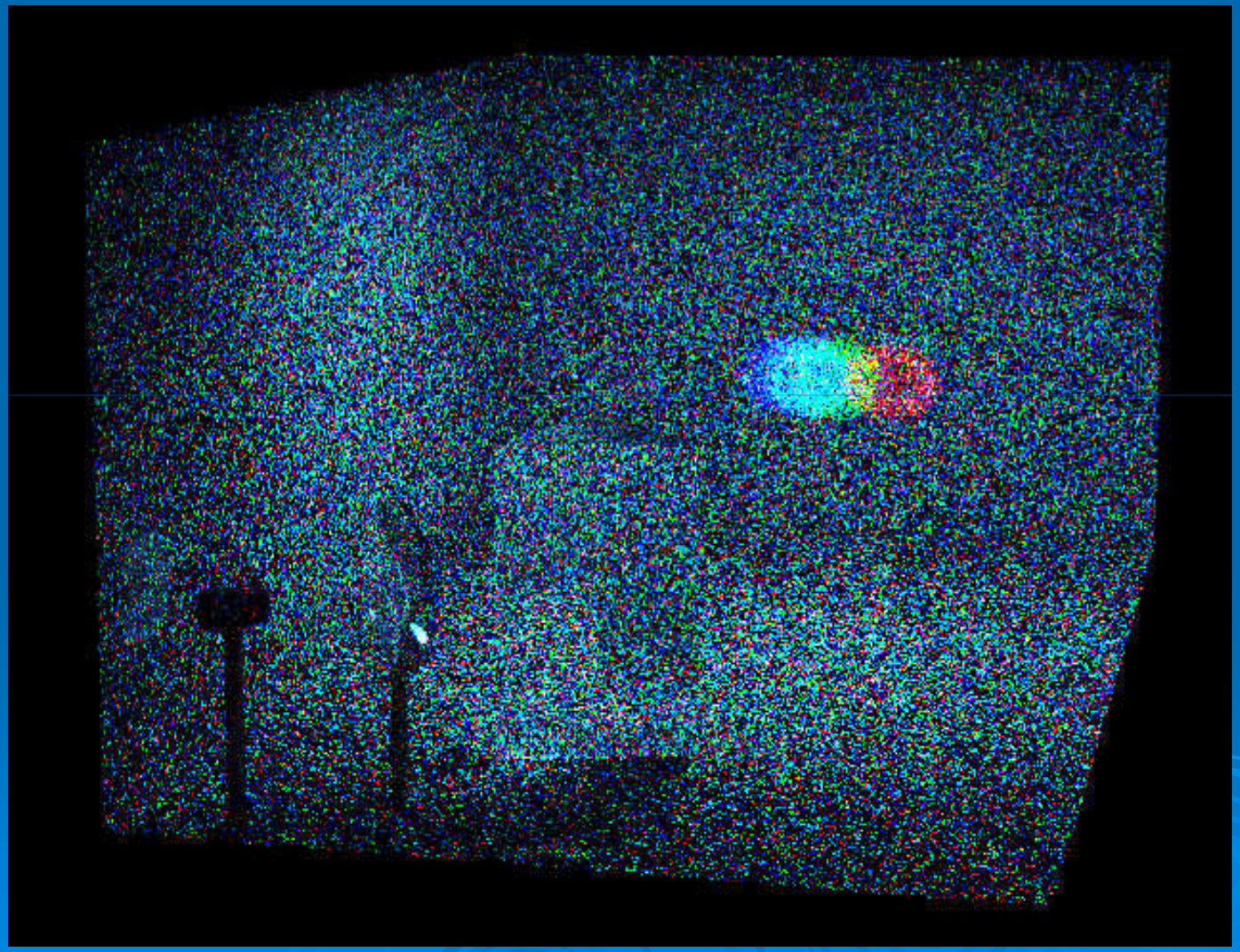
Méthode de Monte-Carlo



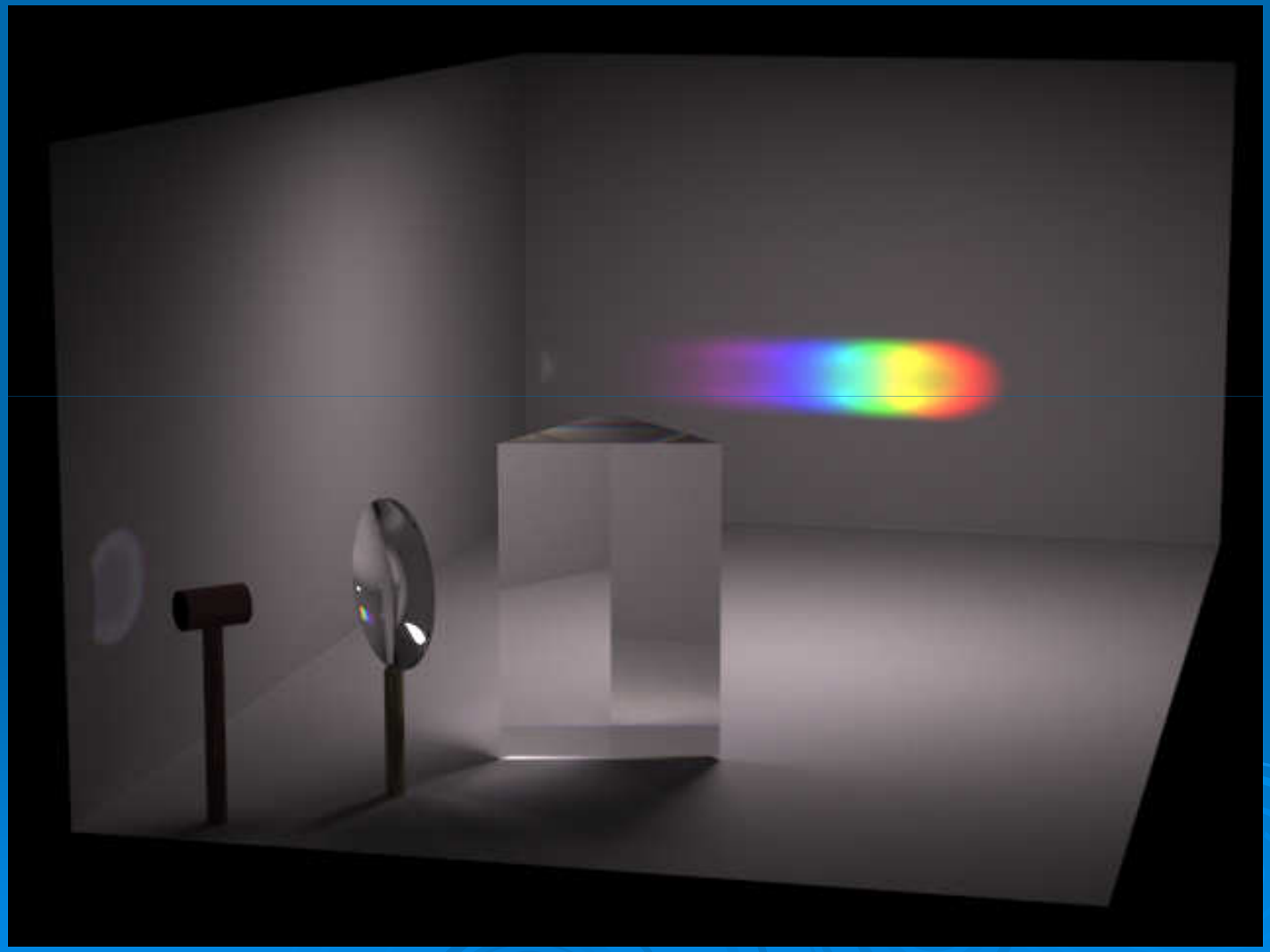
Méthode de Monte-Carlo



Méthode de Monte-Carlo



Méthode de Monte-Carlo



Méthode de Monte-Carlo

Méthode de Monte-Carlo

E.C.P. 2004/2005

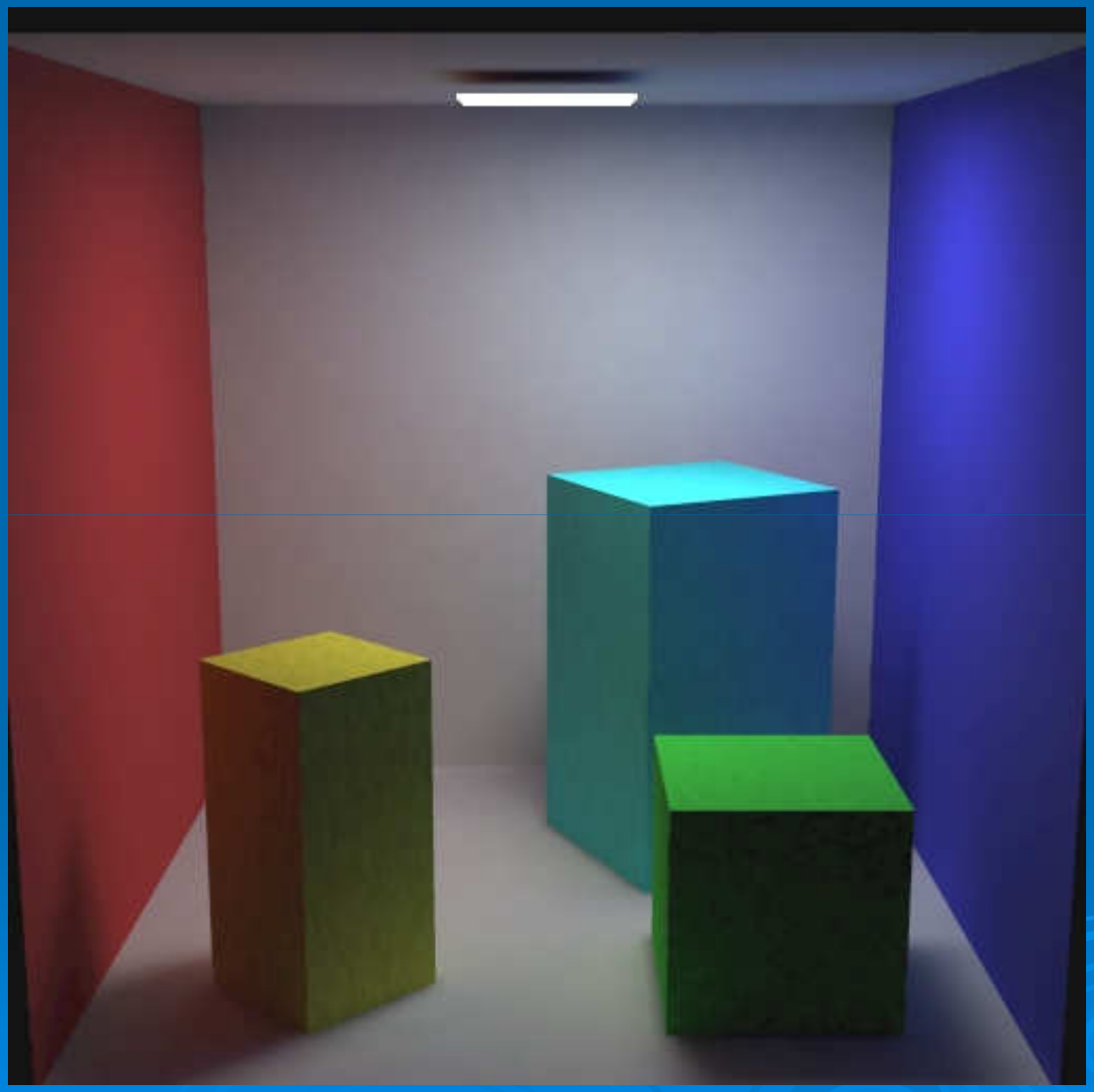
Radiosité

$$B_j = E_j + \rho_j \sum_{i \neq j} B_i F_{ij}$$

Radiosité

$$[M]\times[B]=[E]$$

$$\begin{bmatrix} 1 & -\rho_1 F_{12} & \cdots & -\rho_1 F_{1n} \\ -\rho_2 F_{21} & 1 & \cdots & -\rho_2 F_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ -\rho_n F_{n1} & -\rho_1 F_{n2} & \cdots & 1 \end{bmatrix} \times \begin{bmatrix} B_1 \\ B_2 \\ \vdots \\ B_n \end{bmatrix} = \begin{bmatrix} E_1 \\ E_2 \\ \vdots \\ E_n \end{bmatrix}$$



Capturer l'éclairage réel

- Light probe

Capturer l'éclairage réel

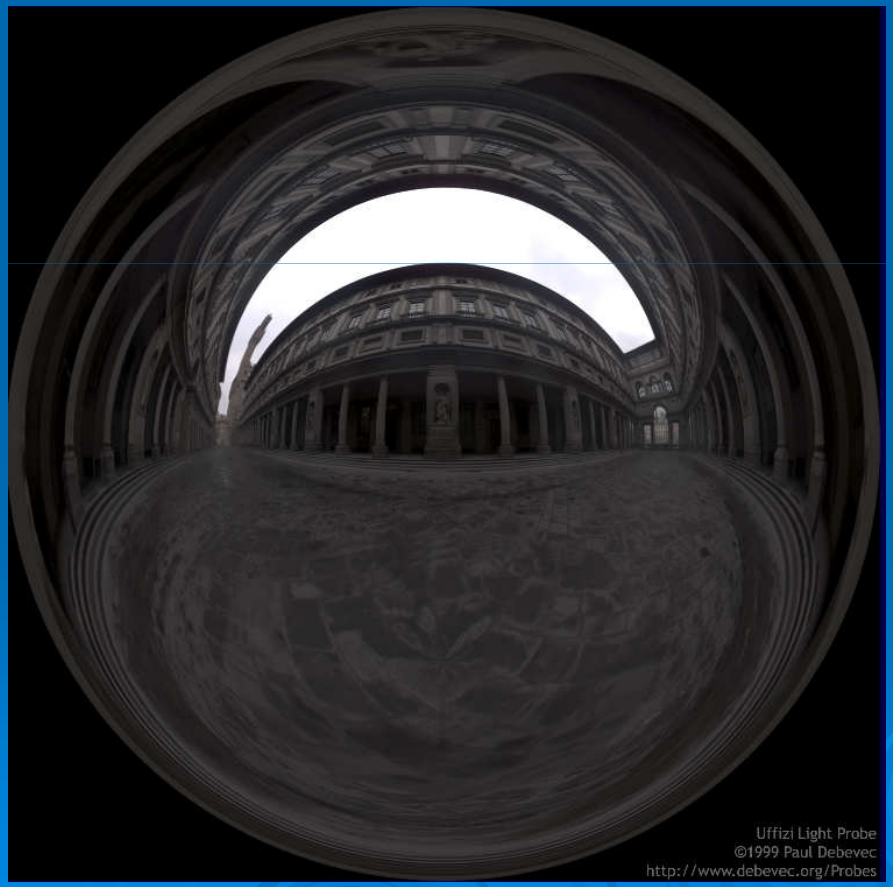
- Light prob

Capturer l'éclairage réel

- Light prob

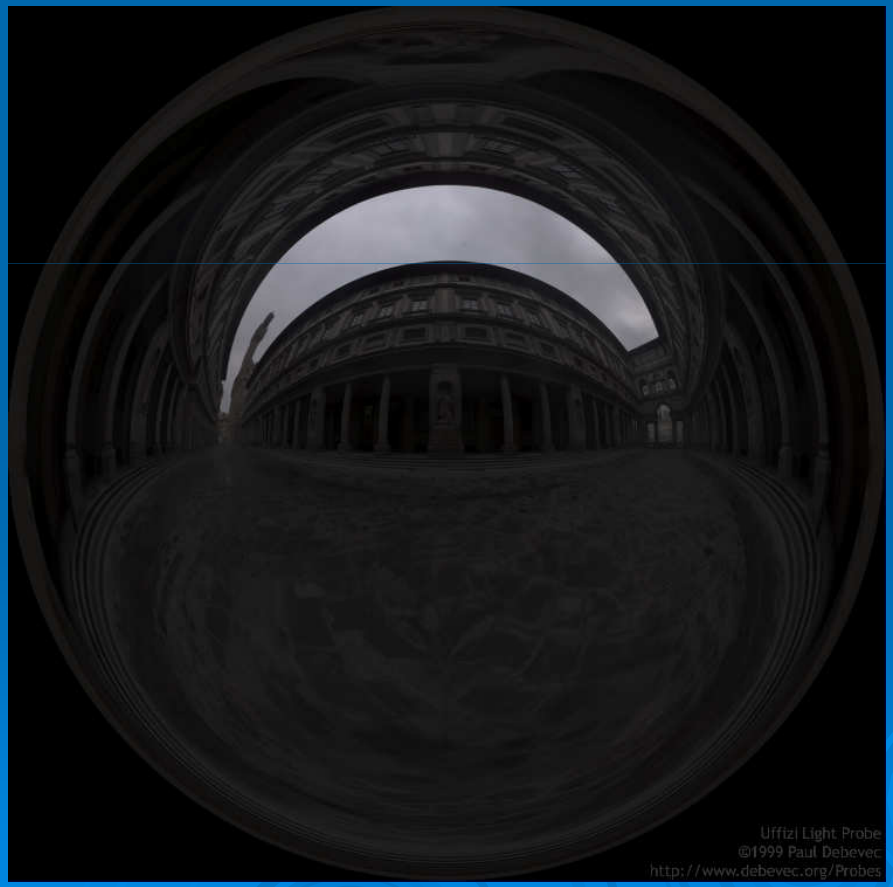
Capturer l'éclairage réel

- Light prob



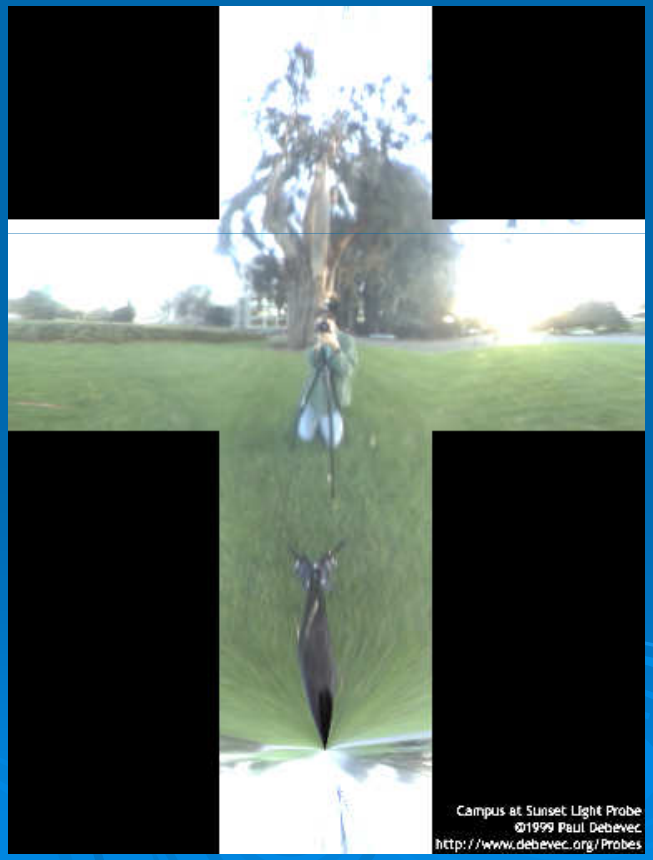
Capturer l'éclairage réel

- Light prob



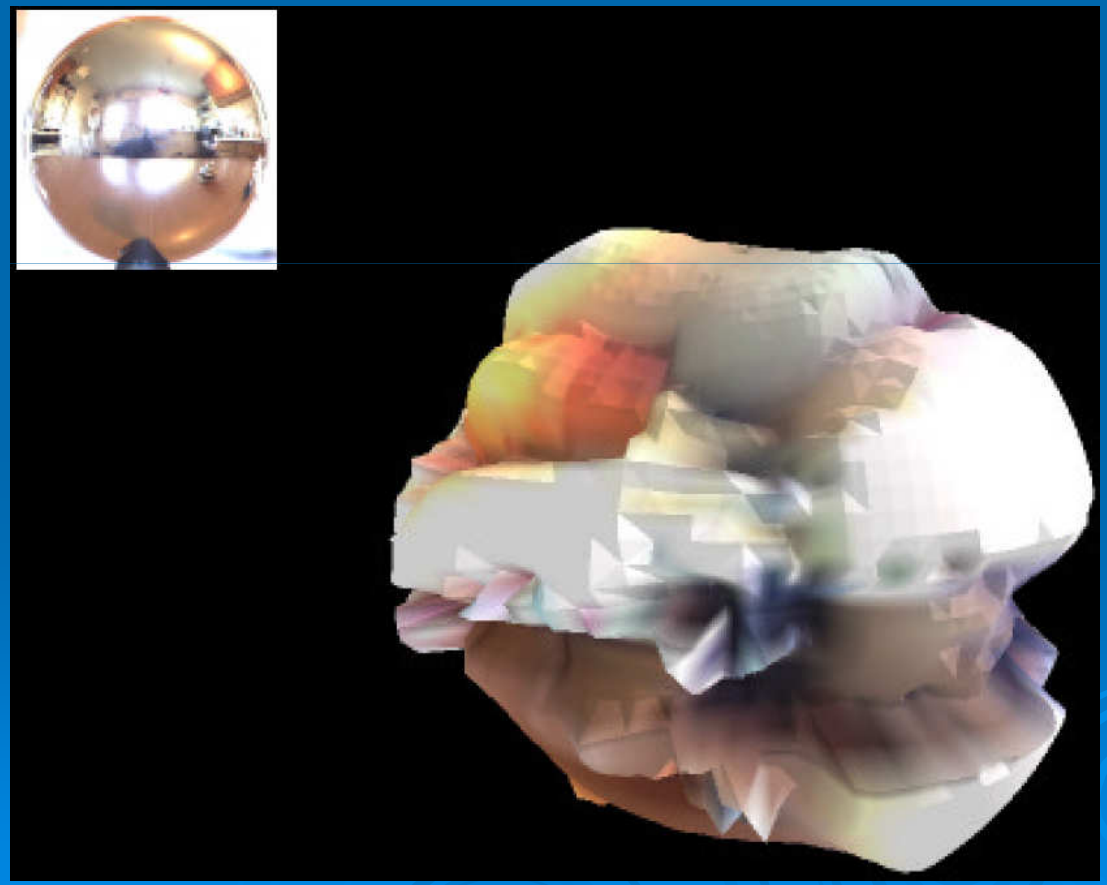
Capturer l'éclairage réel

- Light prob



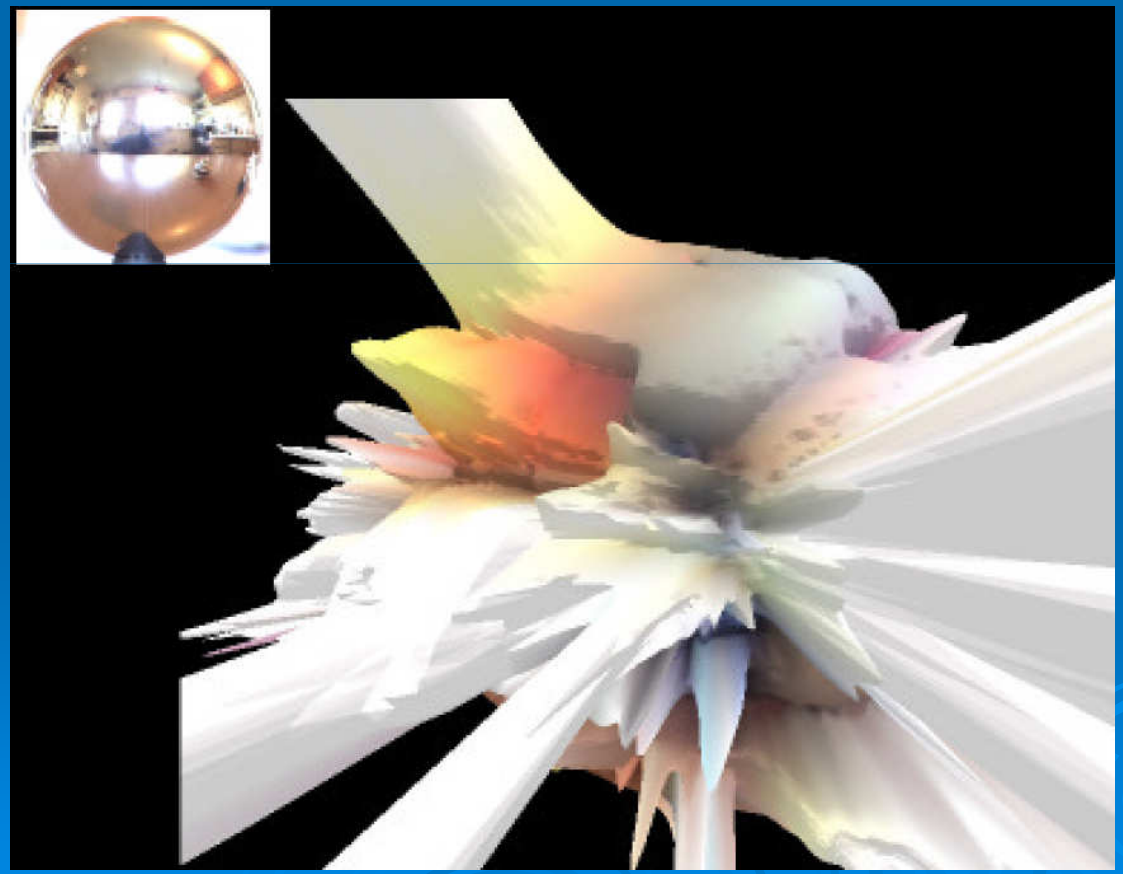
Capturer l'éclairage réel

- Light prob LDRI



Capturer l'éclairage réel

- Light prob HDRI



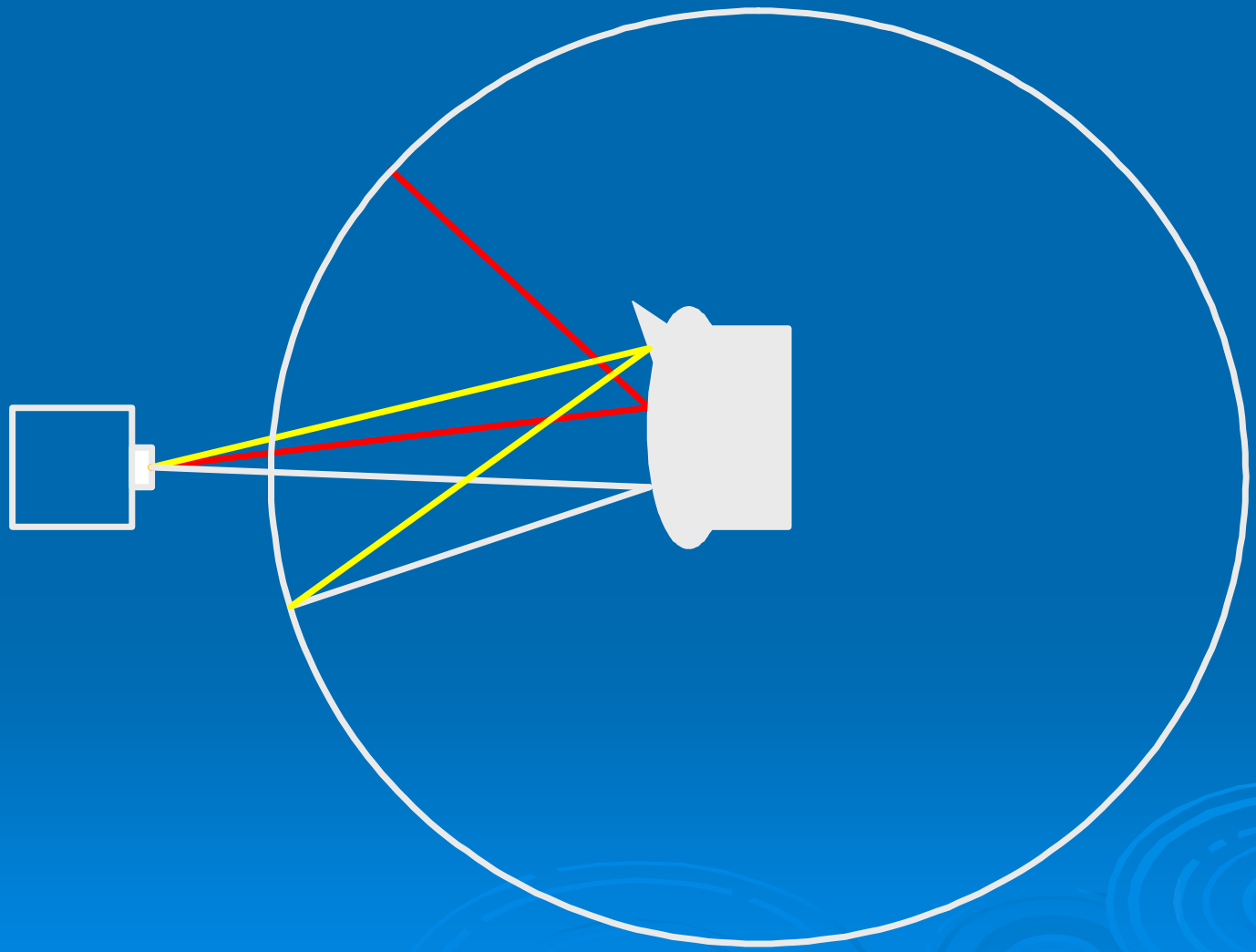
Capturer l'éclairage réel

- Light prob LDRI

Capturer l'éclairage réel

- Light prob HDRI

Mapping d’environnement HDRI



Mapping d'environnement HDRI

- Histoire
  - Blinn 1976

Mapping d'environnement HDRI

- Histoire
  - 1982 – 1983 – Première photo_mapping

Mapping d'environnement HDRI

- Histoire
  - 1991

Mapping d'environnement HDRI

- Histoire
  - 1993 – TR - SGI

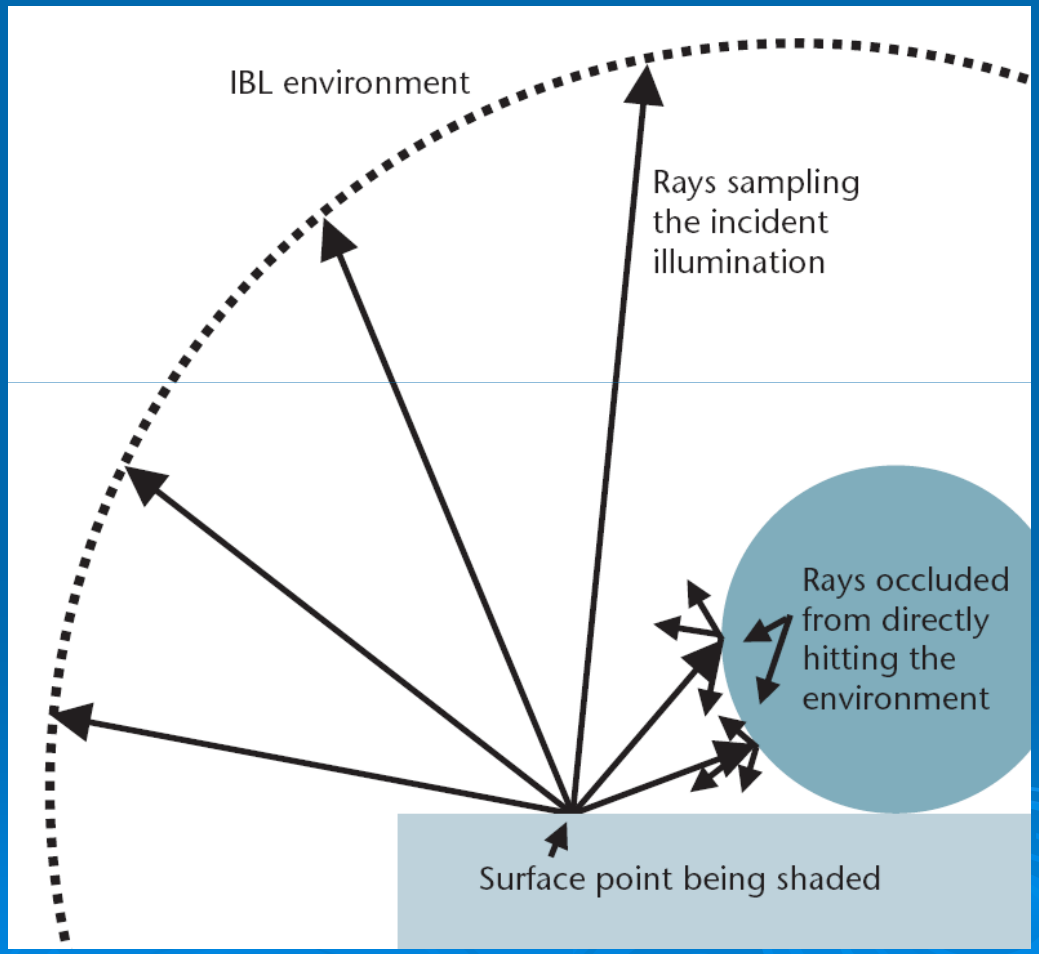
Mapping d’environnement HDRI

- HDRI

Mapping d’environnement HDRI

- HDRI

Illumination globale

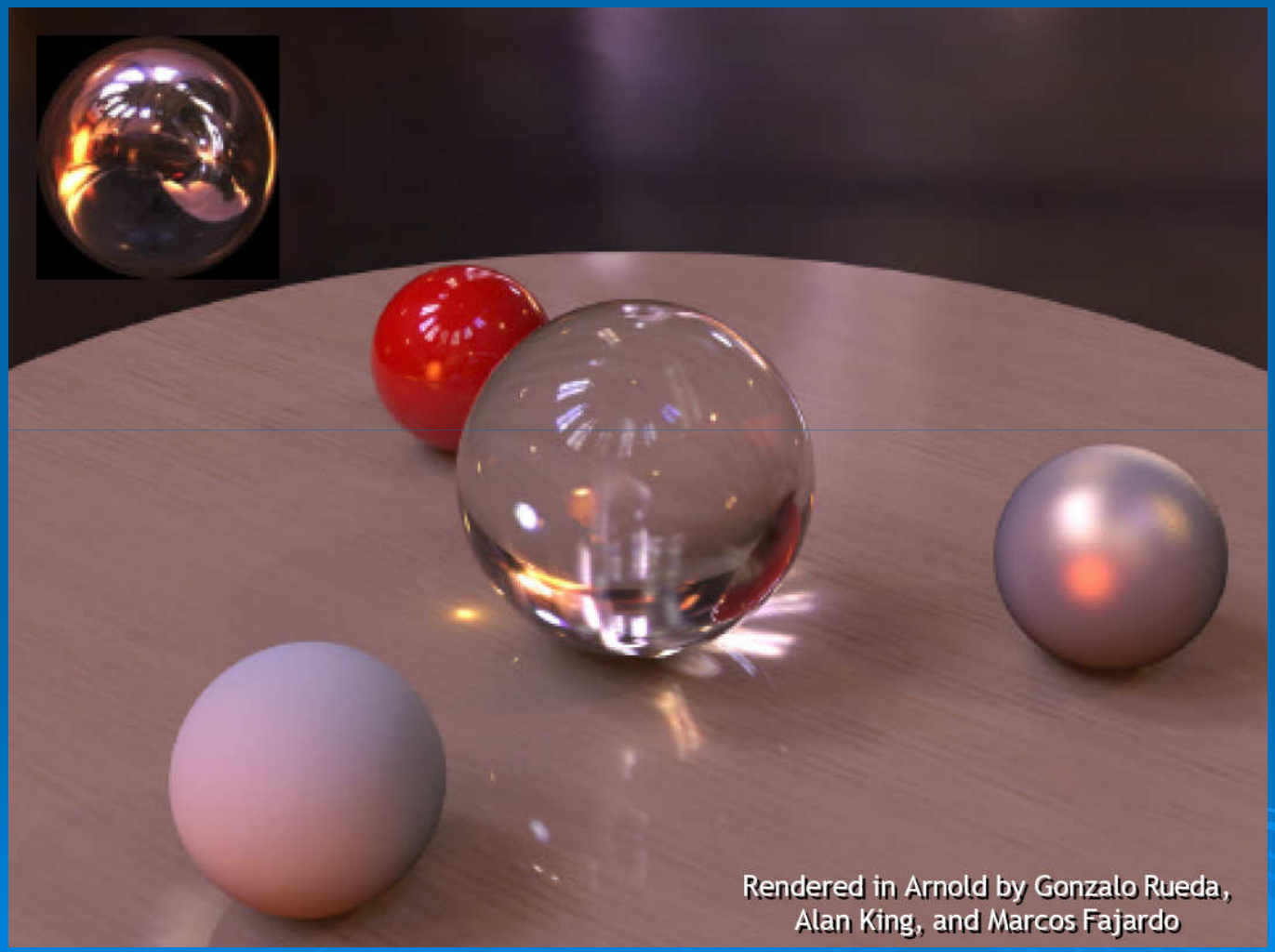


Illumination globale

Illumination globale

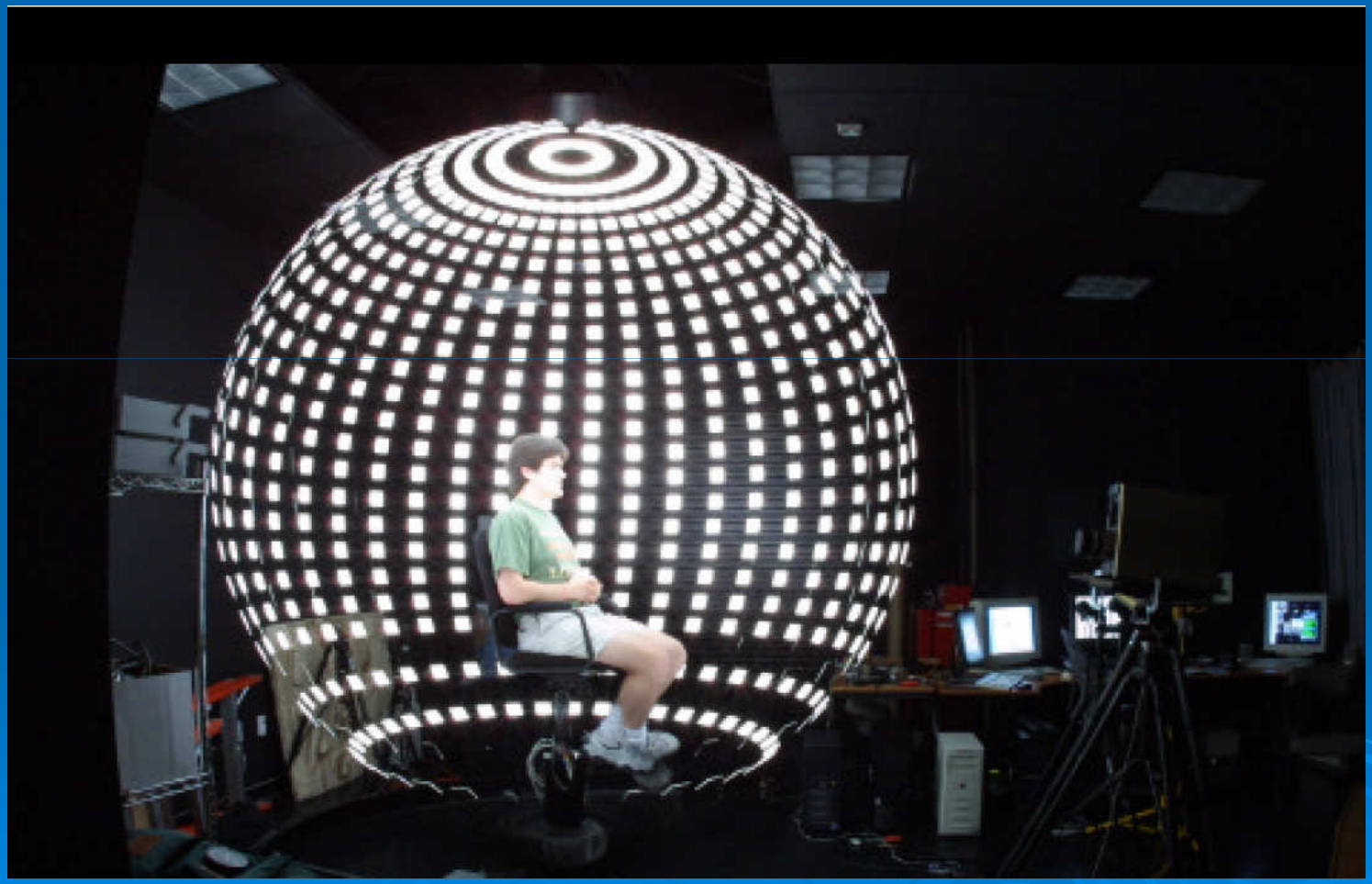
Illumination globale

Illumination globale

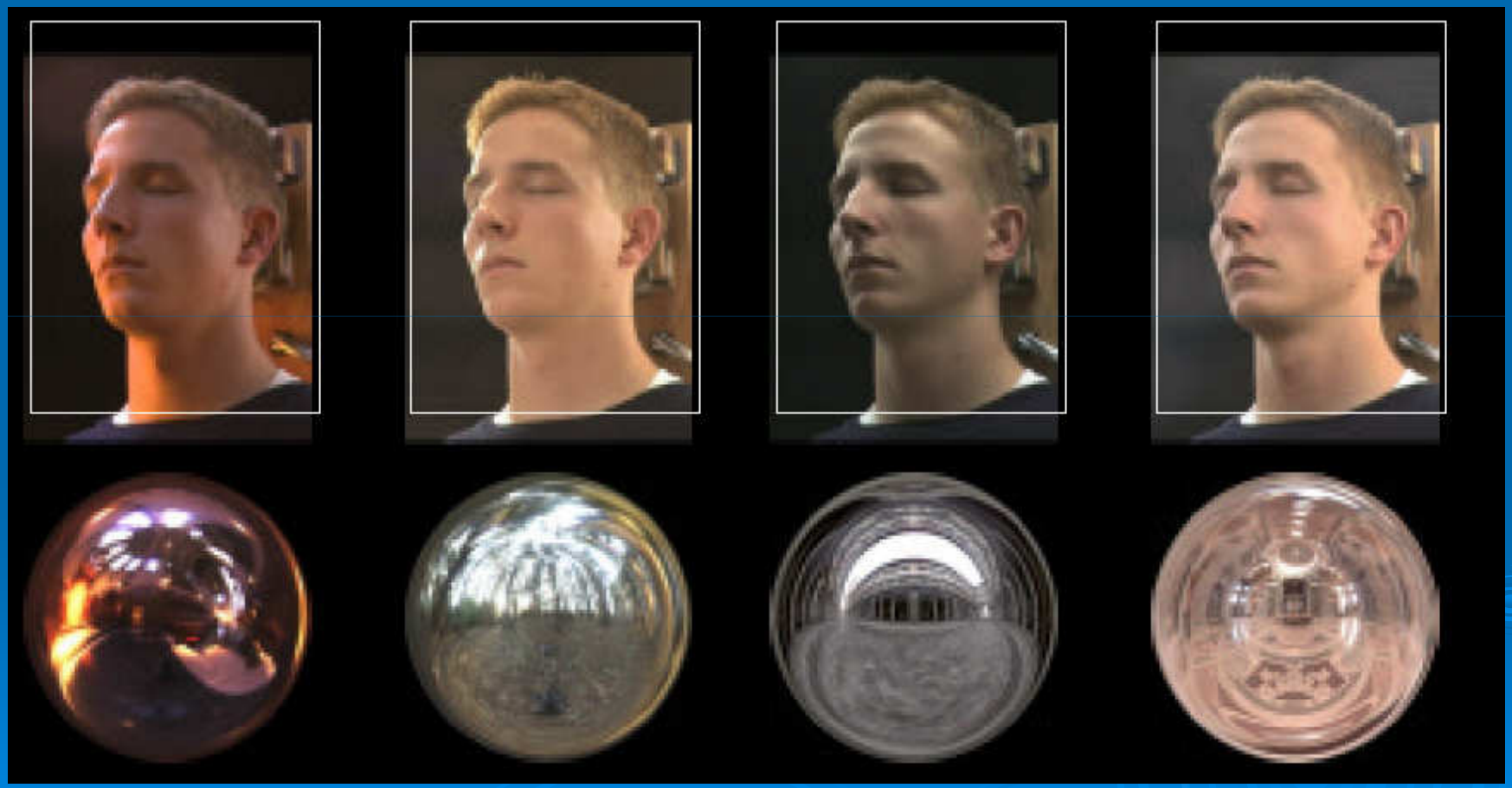


Capture de champs de réflectance d'une visage

Capture de champs de réflectance d'une visage



Capture de champs de réflectance d'une visage



Capture de champs de réflectance d’une visage