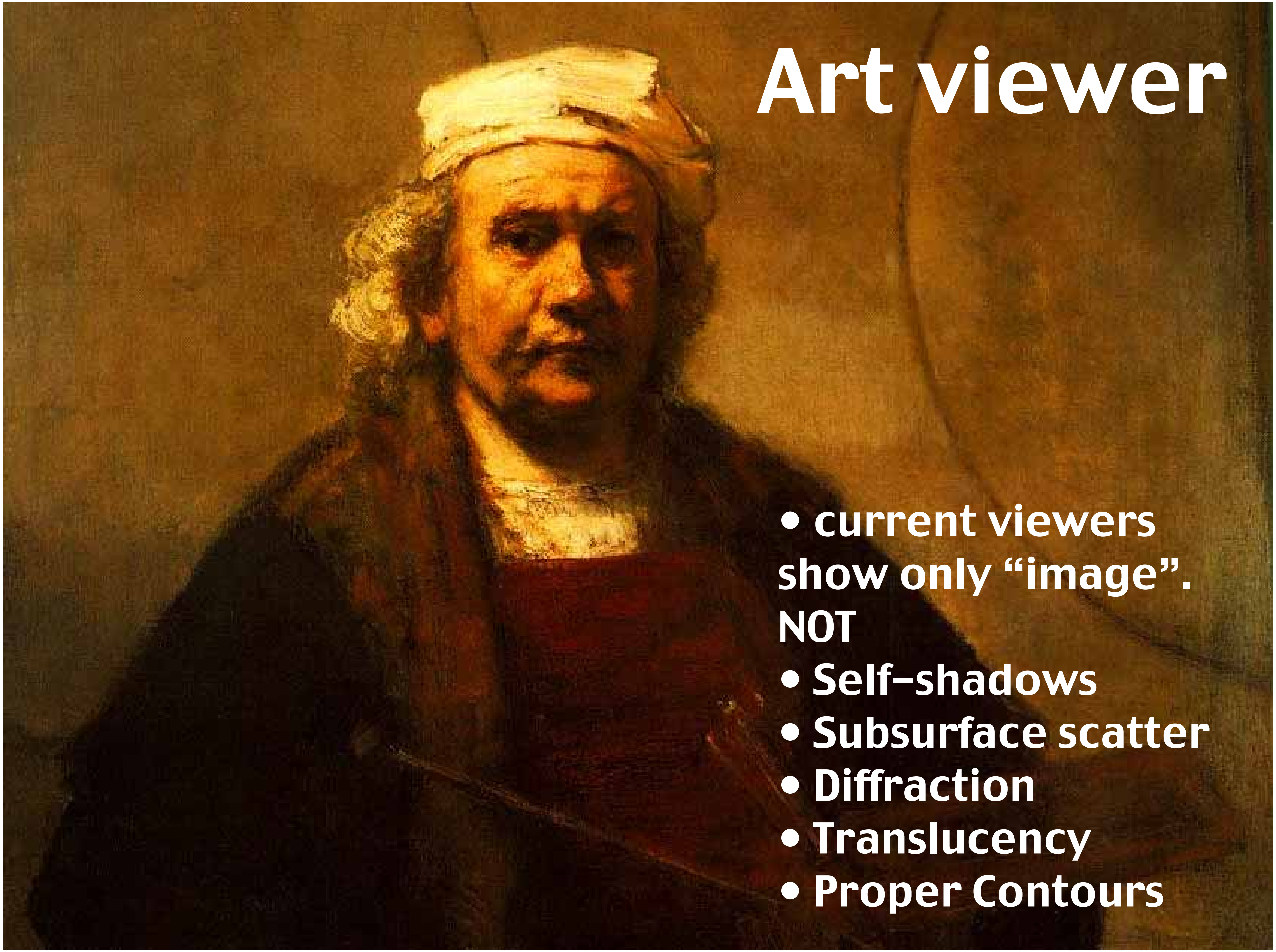
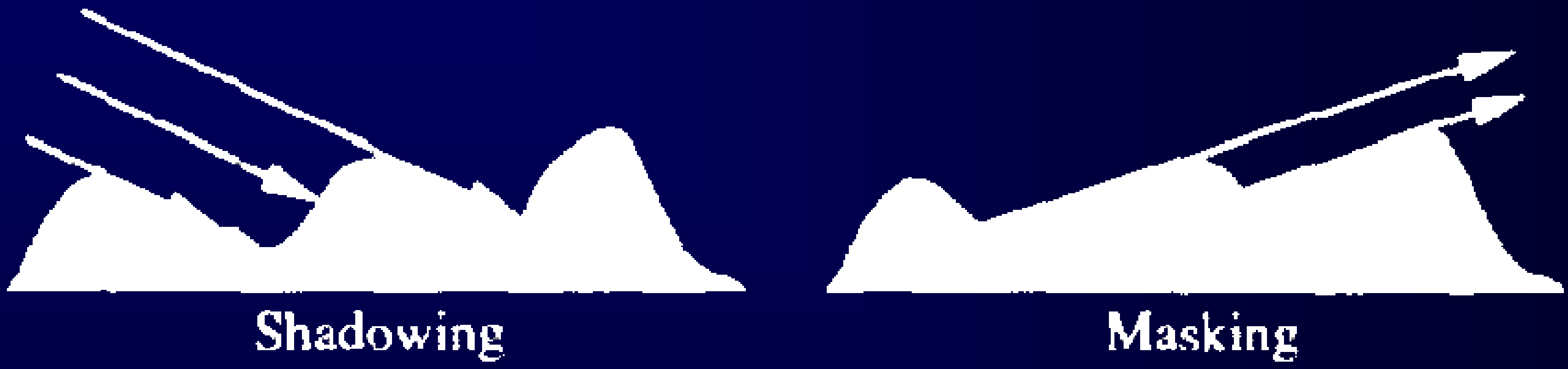

Art viewer
• current viewers show only "image".
NOT
• Self-shadows
• Subsurface scatter
• Diffraction
• Translucency
• Proper Contours

Self-shadowing, masking



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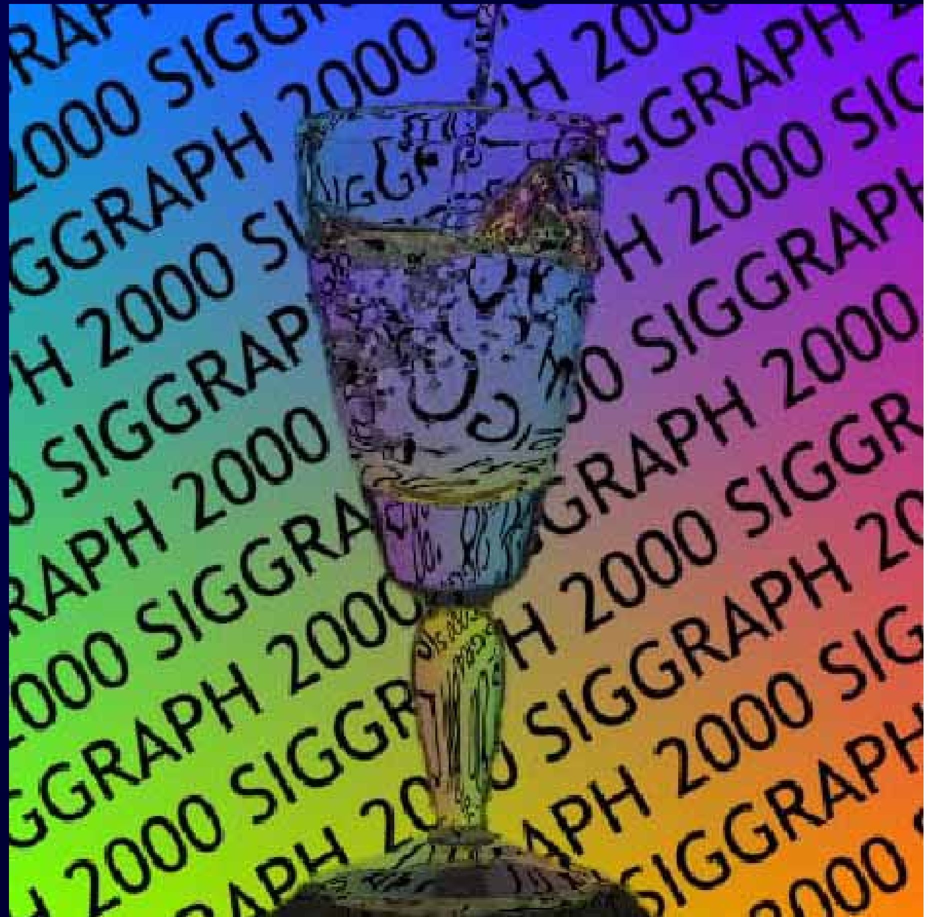
bump
map:
surface-
normal
correction

displace
-ment
mapping
:
surface
height
correcti
on

horizon-
map:
self-
shadowin
g

Both

Diffraction



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Translucency

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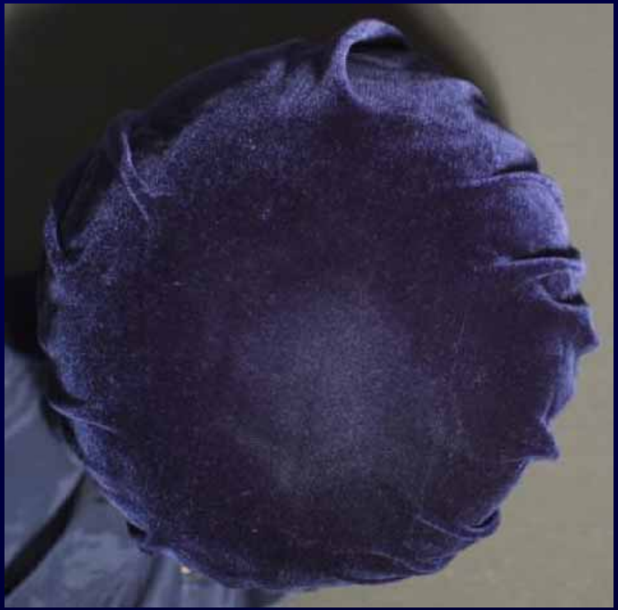
Anisotropy

smooth metal

Velvet



brushed metal

Bidirectional Reflectance Transfer Function

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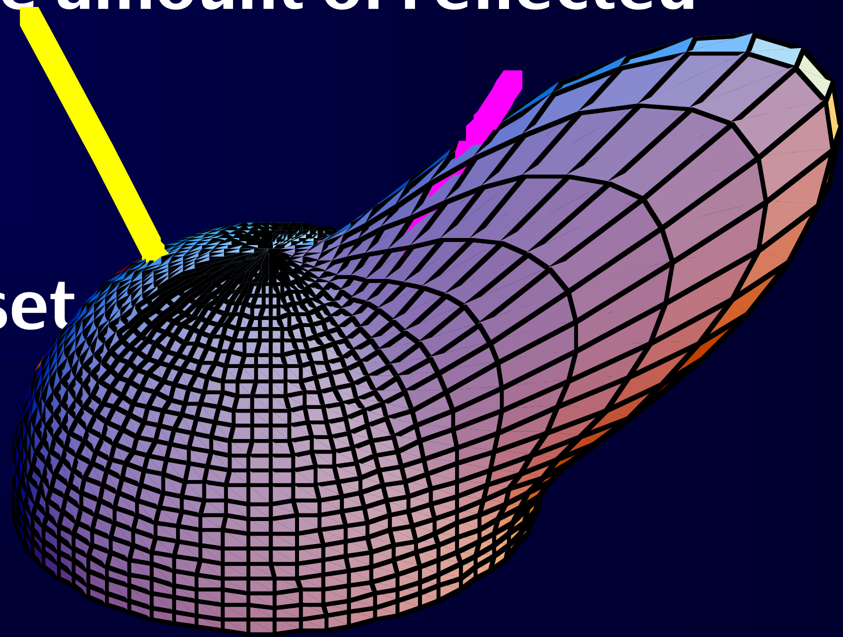
BRDF: a way to model material reflectance accurately

For EVERY ingoing light ray, we measure in

EVERY outgoing direction the amount of reflected light



This results in MASSIVE dataset

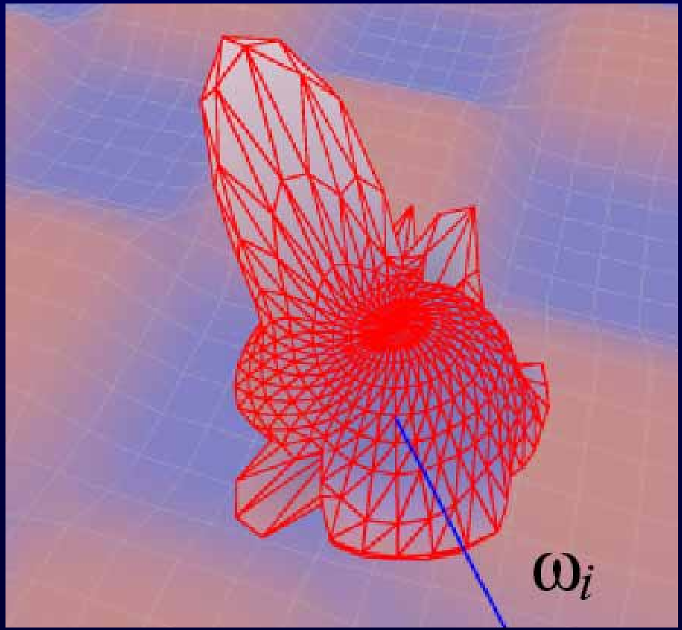
360°x90°x16bit RGB

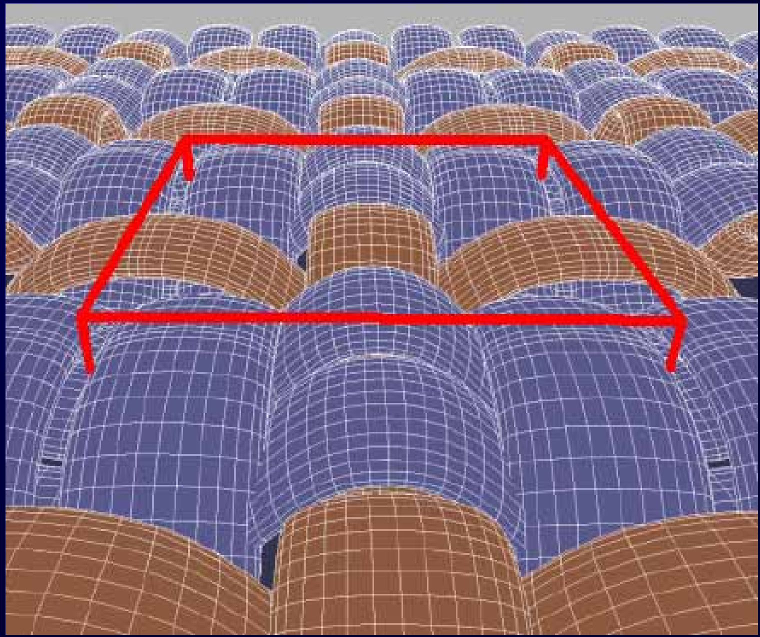
1 sample per degree

=> 194kb per incoming ray

BRDF Texture

For irregular surface, separate BRDF for each surface p





Measuring a BRDF

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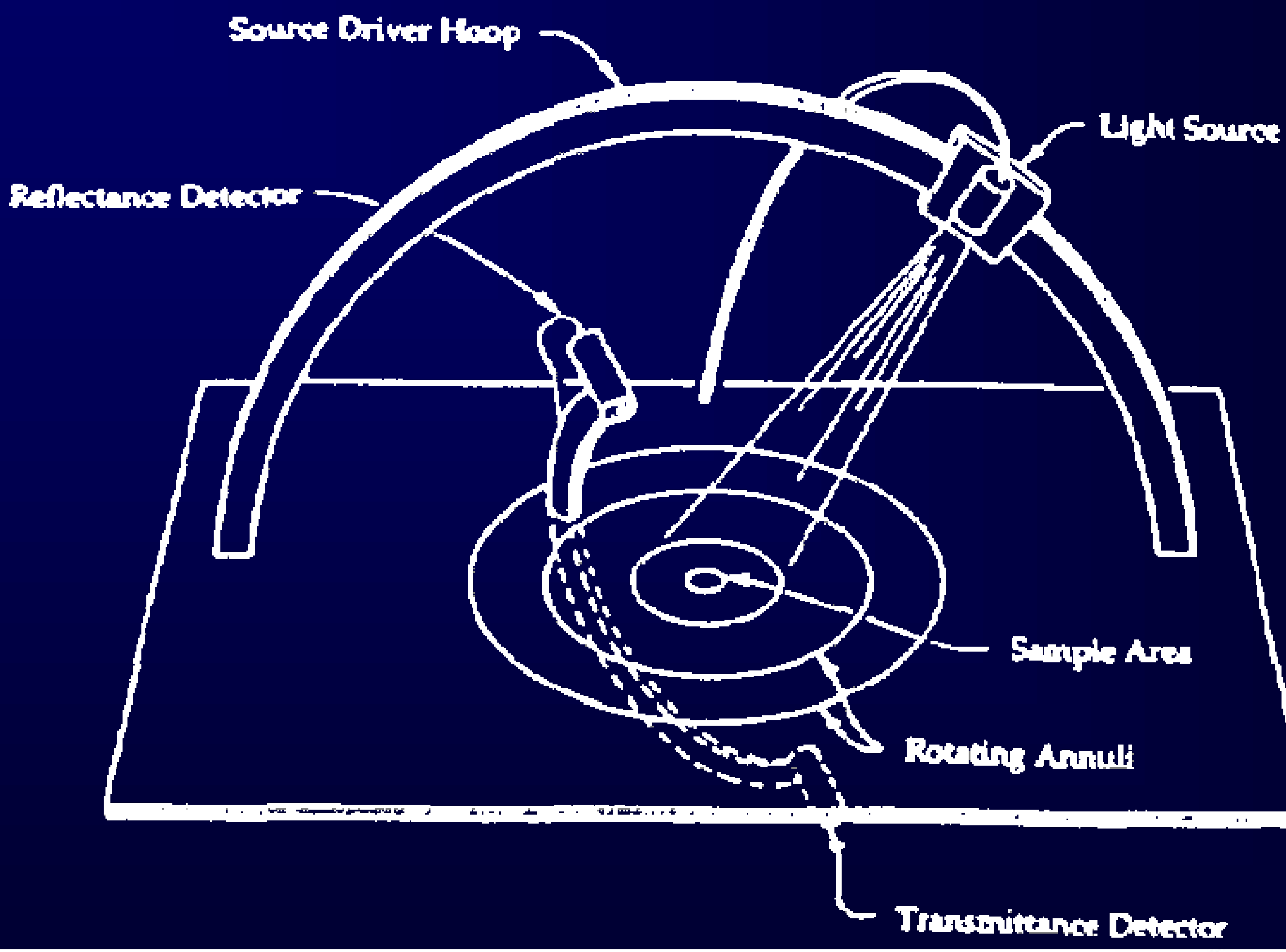
Brute Force approach



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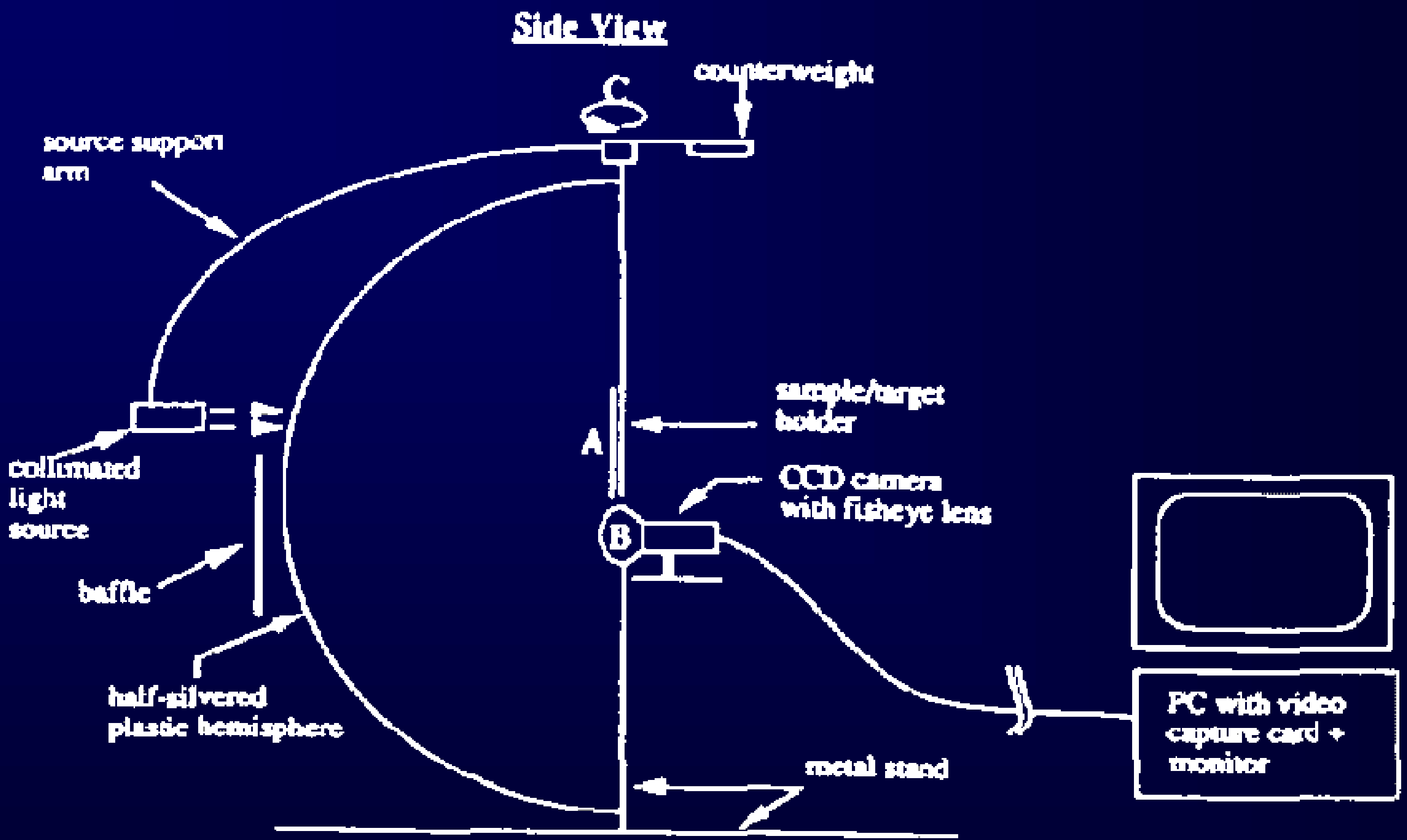
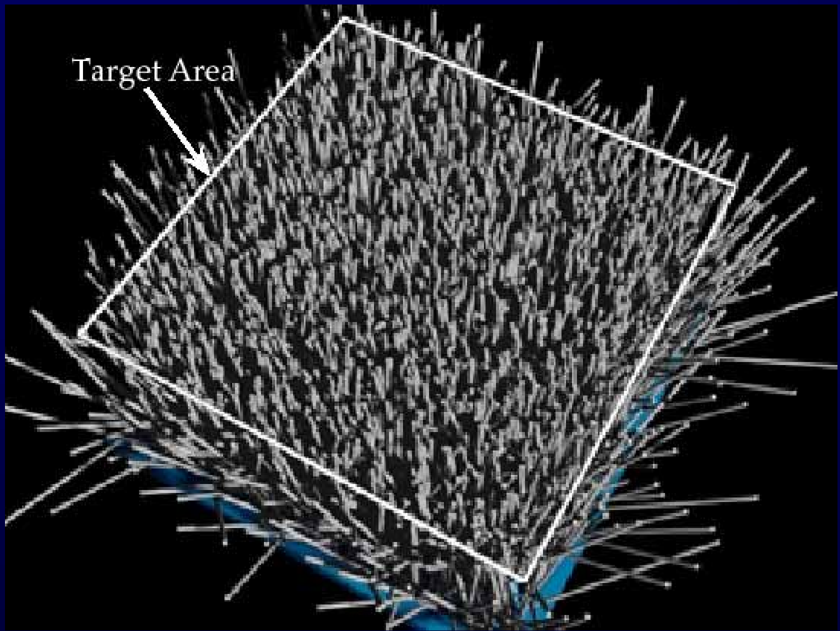
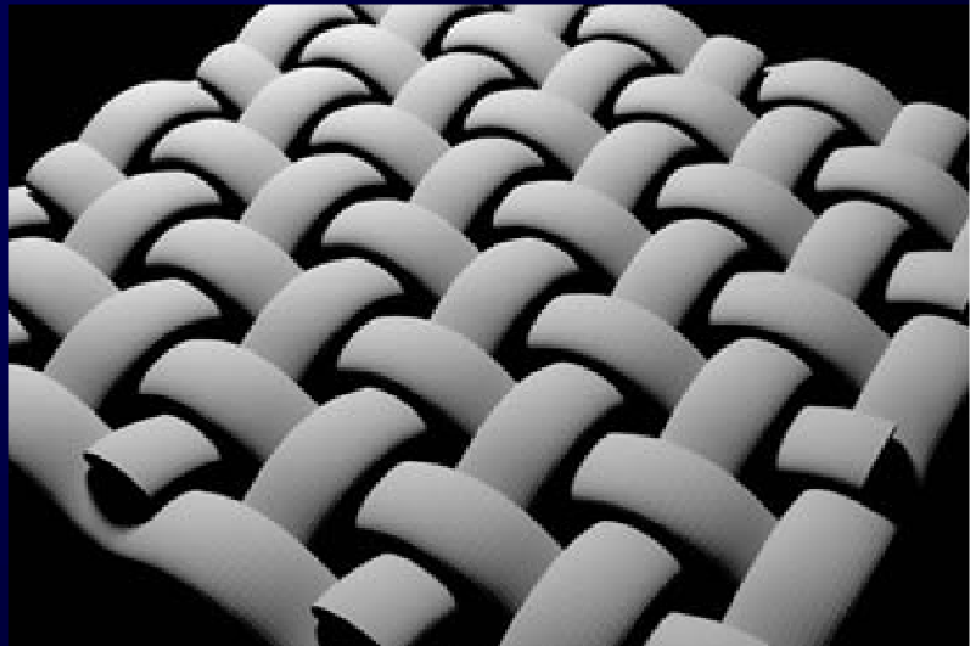
More brute force



Use Raytracer and model microgeometry





(Westin,1992)

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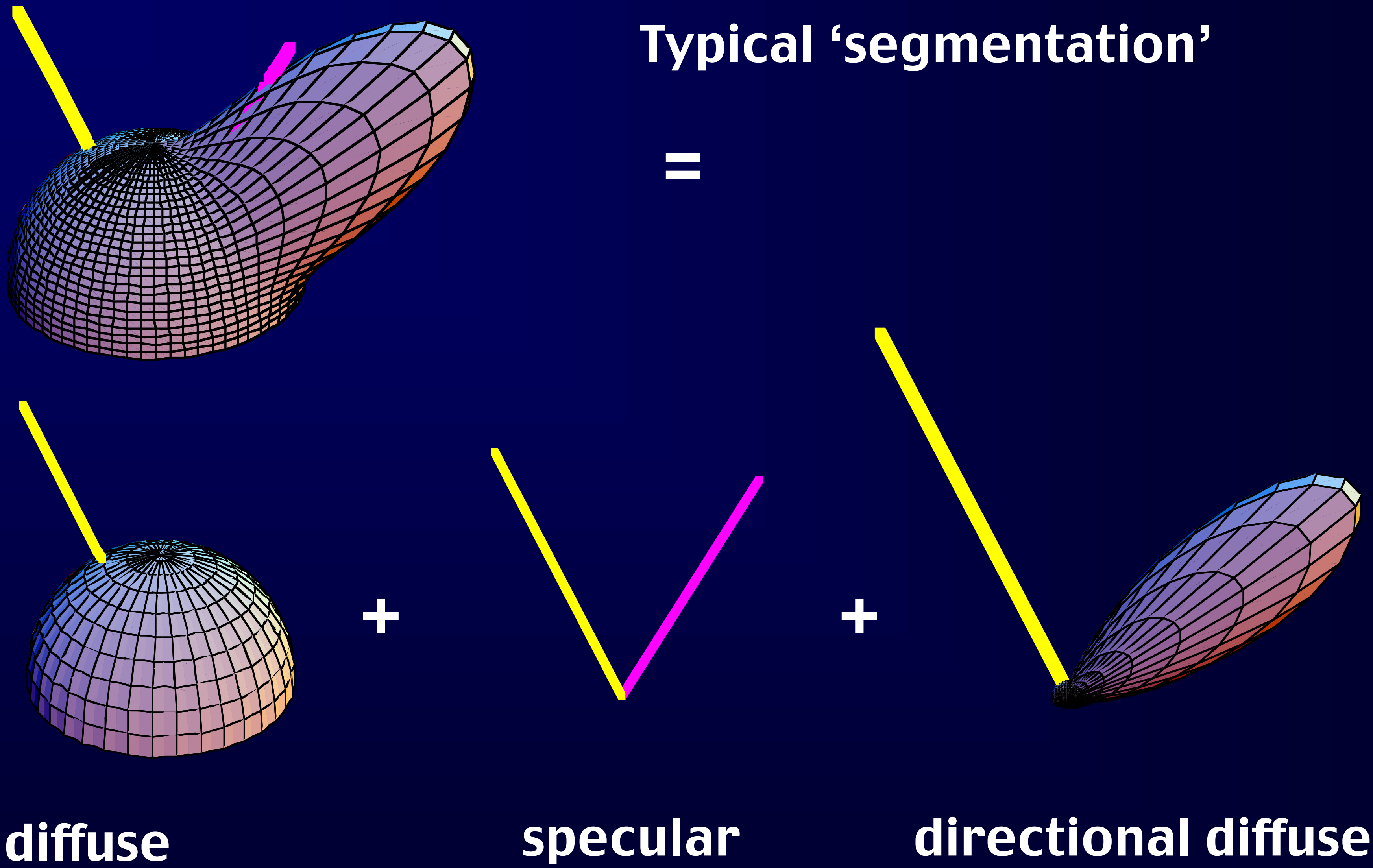
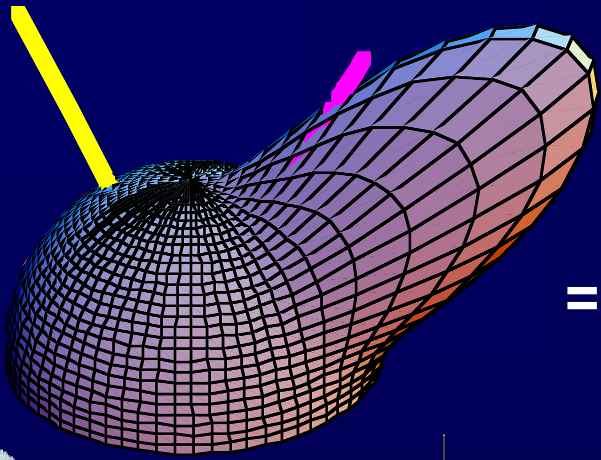
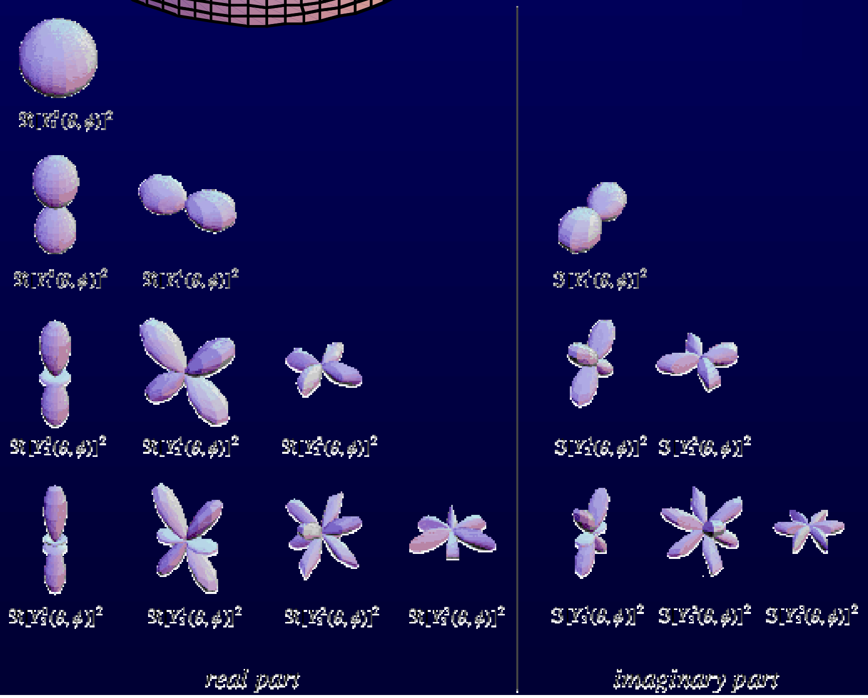
Model Fitting (1) Physically Plausible



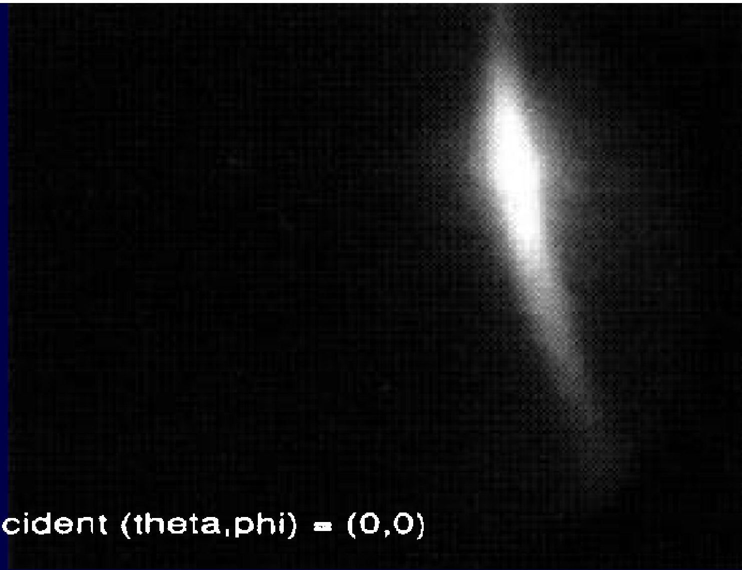
Model Fitting (2) Convenient Basis

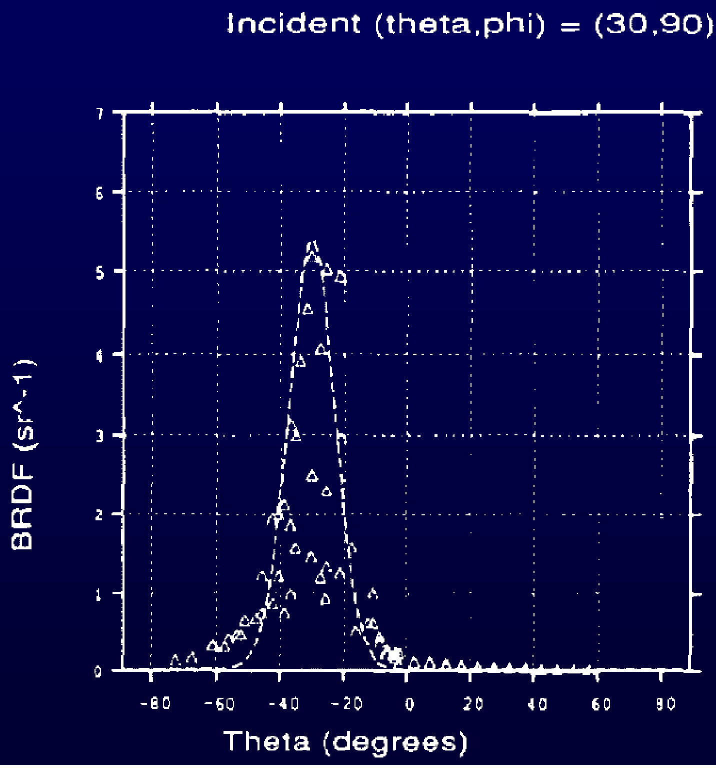


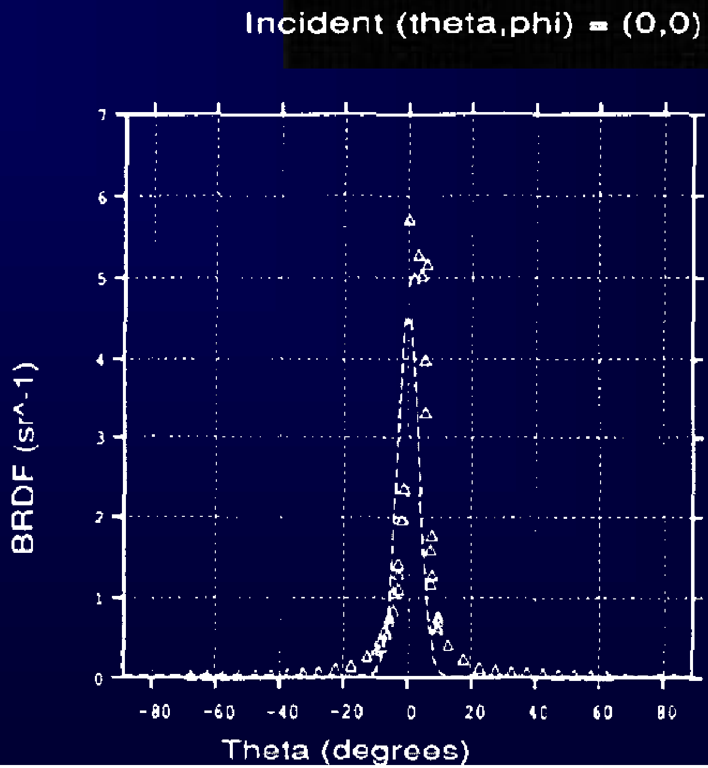
$$= -0.2Y_{11} + 0.2Y_{32} + 0.2Y_{53} - 0.3Y_{54}$$



Real BRDF not so simple







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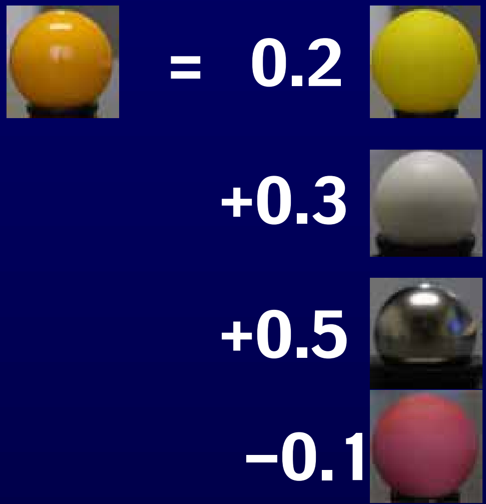
Fit to known materials



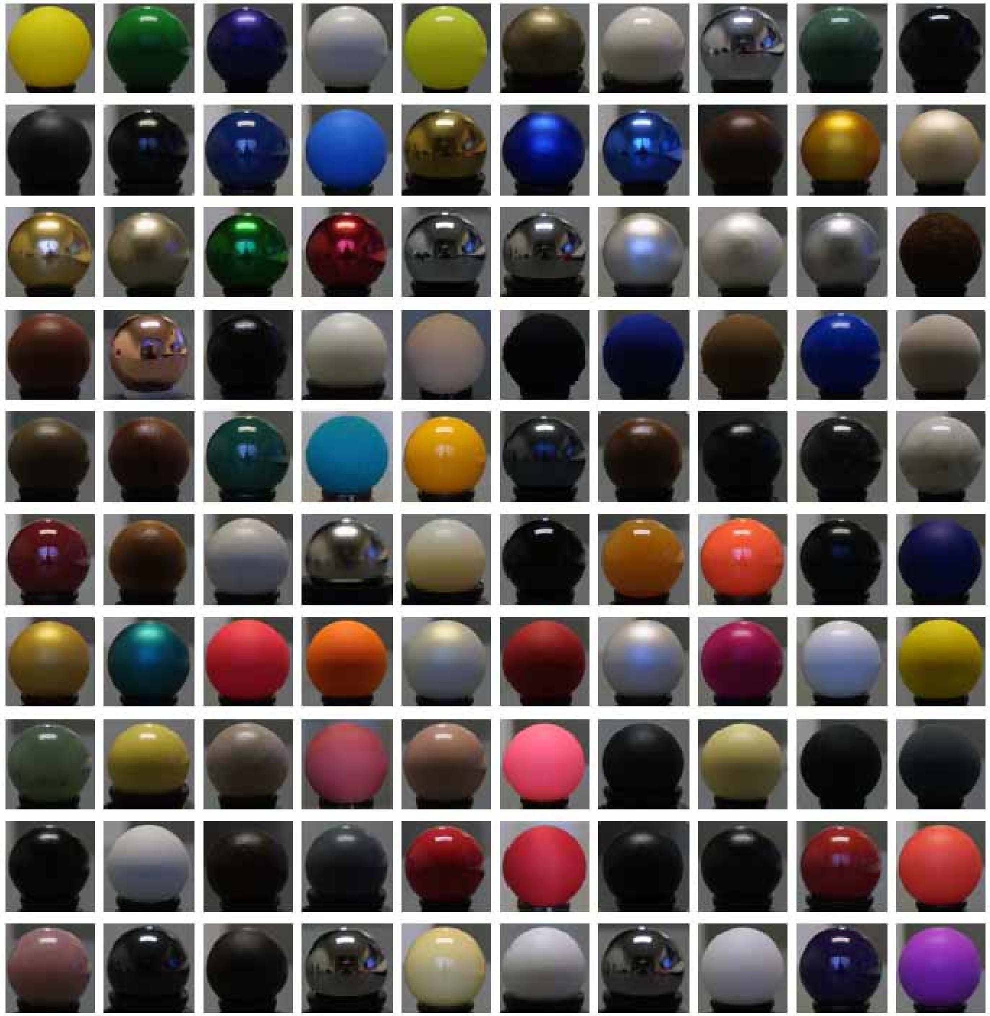


Figure 5: Pictures of 100 of our acquired materials.

Realtime Rendering

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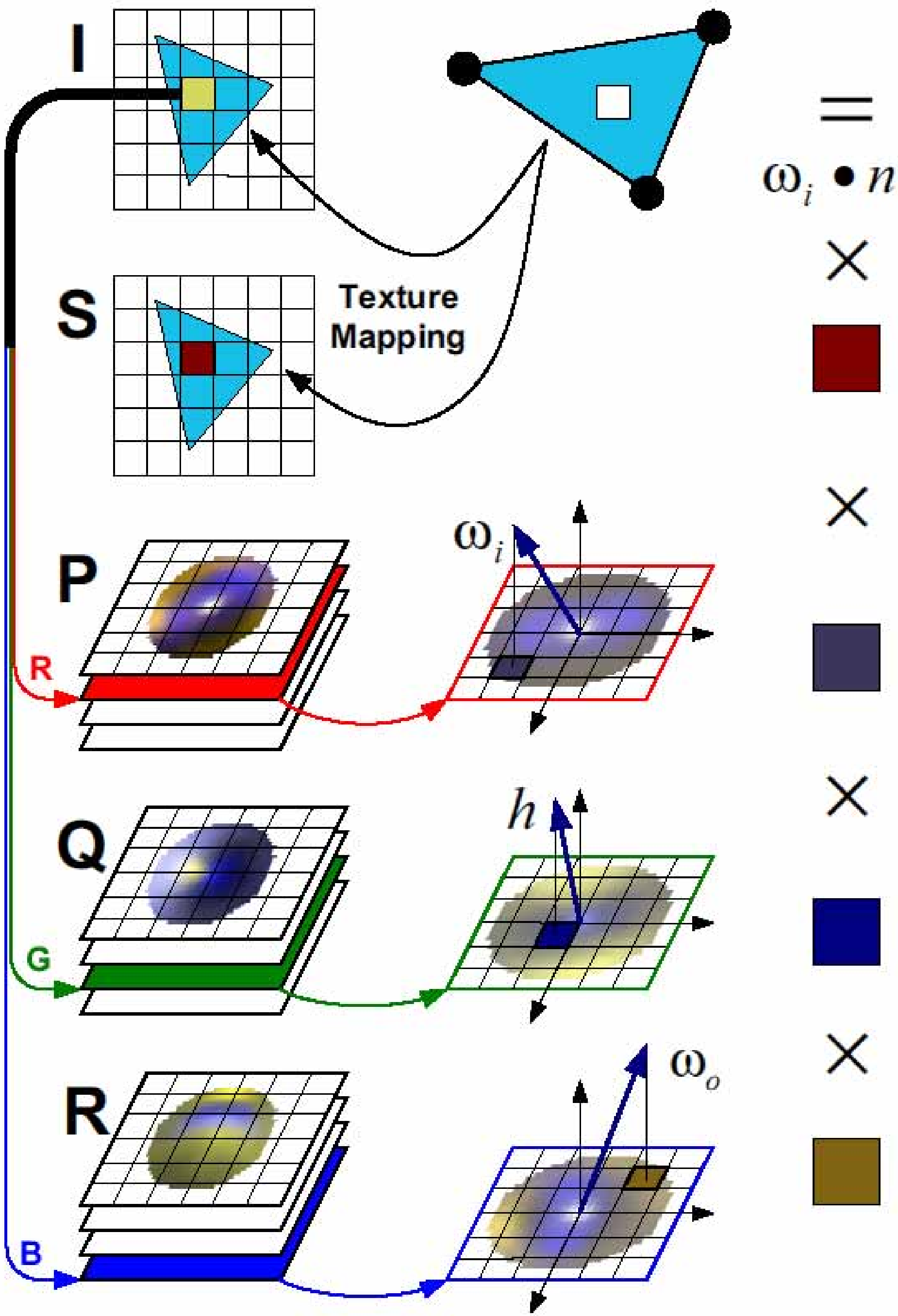
Using 3D Hardware for fast BRDF Rendering



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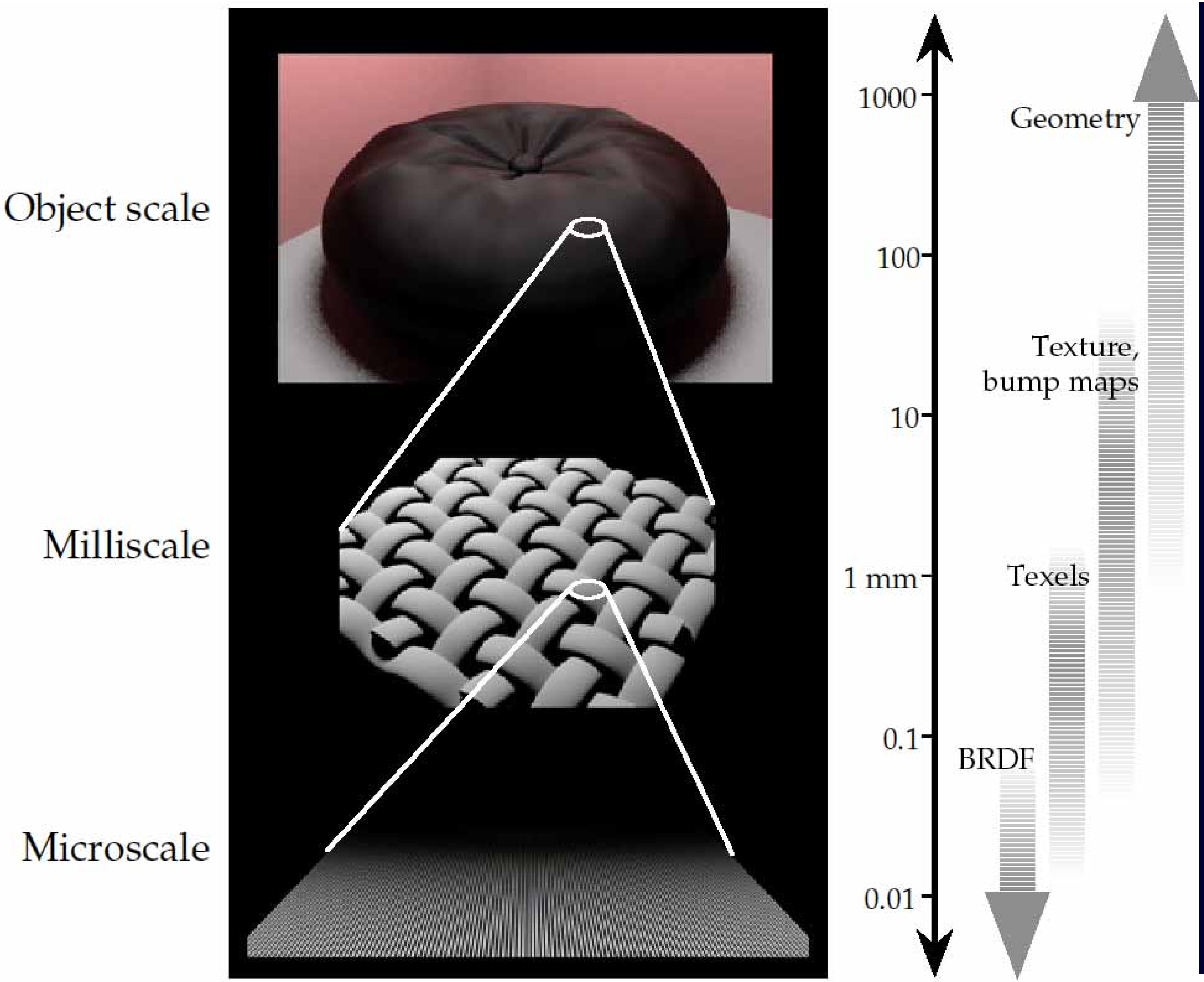

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