New Wave PBR Materials
December 2020

Model is CC0 by Guido Odendahl
Visualized by the Stellar Path Tracer from Dassault Systèmes
glTF - The JPEG of 3D!

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New market opportunities for 3D content creation and deployment!

Efficient, reliable transmission
Bring 3D assets into 1000s of apps and engines

Compact to Transmit ✓✓
Simple and Fast to Load ✓✓
Describes Full Scenes ✓✓
Runtime Neutral ✓✓
Open and Extensible ✓✓

glTF 1.0 - December 2015
Primarily for WebGL
Uses GLSL for materials

glTF 2.0 - June 2017
Native AND Web APIs
Physically Based Rendering
Metallic-Roughness and Specular-Glossiness

glTF spec development on open GitHub - get involved!
https://github.com/KhronosGroup/glTF
Core glTF 2.0 Asset Structure

- **.gltf (JSON)**
  - Node hierarchy, PBR material textures, cameras

- **.bin**
  - Geometry: vertices and indices
  - Animation: key-frames
  - Skins: inverse-bind matrices

- **.png**
- **.jpg**
- **.ktx2**
  - Textures

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PBR stands for “Physically-Based Rendering”

**Mandatory Metallic-Roughness Materials**
- Base Color (Albedo)
- Metalness
- Roughness
- Emission
- Normal Map
- Baked Ambient Occlusion

**Optional Specular-Glossiness Materials**
- Diffuse
- Specular
- Glossiness

Texture based PBR materials
glTF PBR Materials Roadmap

Creating a rich physically-based material framework for the glTF ecosystem

glTF extensions add PBR material parameters that integrate with and build on existing materials

Building industry consensus on interoperable PBR that is also deployable on diverse platforms and devices

June 2017
Core glTF 2.0
Mandatory Metallic-Roughness
Optional Specular-Glossiness

December 2020
First Wave glTF PBR Extensions
Clear Coat
Transmission
Sheen

Future Waves of glTF PBR Extensions
Subsurface Scattering, Attenuation,
Index of Refraction (IOR), Thickness, Specular Color,
Anisotropy, Translucency, Thin Film (iridescence)
and more...

Roadmap includes requirements from Khronos 3D Commerce Working Group

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glTF Clearcoat, Transmission and Sheen PBR

**Clearcoat**

- KHR_materials_clearcoat
- Clearcoat Factor
- Clearcoat Texture
- Clearcoat Roughness Factor
- Clearcoat Roughness Texture
- Clearcoat Normal Texture

Layers over a Metallic-Roughness Material and optionally over Sheen

**Transmission**

- KHR_materials_transmission
- Transmission Factor
- Transmission Texture

Layers over a Metallic-Roughness Material

**Sheen**

- KHR_materials_sheen
- Sheen Color Factor
- Sheen Color Texture
- Sheen Roughness Factor
- Sheen Roughness Texture

Layers over a Metallic-Roughness Material and optionally under Clearcoat
New Wave PBR Ecosystem Forming Quickly

Tools to Create and View PBR Assets

- Autodesk 3DS Max
- Adobe
- blender

Online Model using Babylon.js

PBR Capable Viewers and Applications

- three.js
- Microsoft
- Babylon.js
- emersya
- AGI

PBR Samples

- glTF Sample Viewer

Input welcome on GitHub from developers and artists.
Let us know what PBR materials are important to you!