

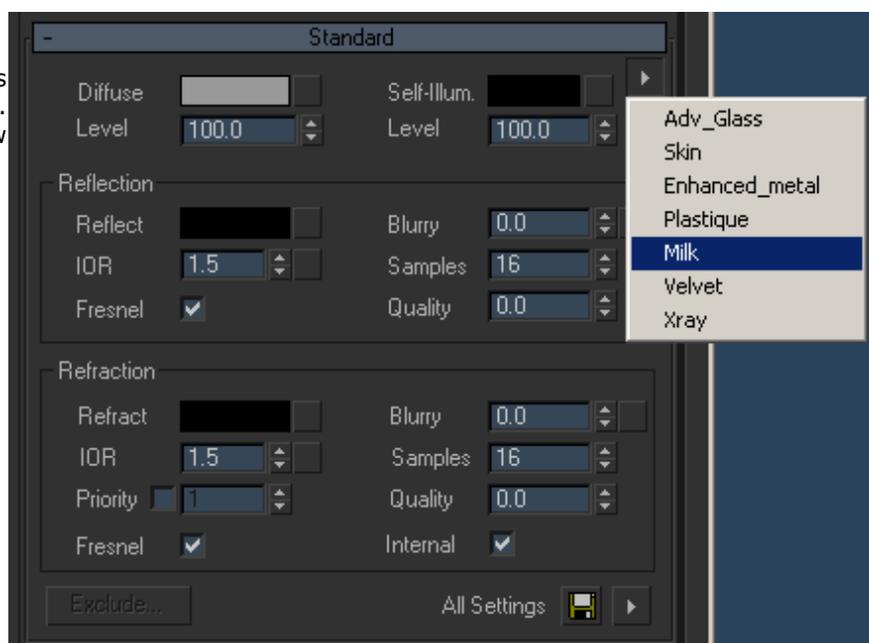
finalRender Stage1 : fR_Advanced

■ Stage1 fR_Advanced material is a complete material to access raytracer. It gives you extra speed from Stage1 raytracer, but also to some advanced functions such as SubSurfaceScattering, dispersion, glossy reflections/refractions, etc. It also gives you controls on four specularity layers, each layers havinf its own maps. You will also not that Diffuse and Selfillum color have level control. Level from 0 to 100 are standard levels, but it allow you to use more than 100 (HDR) level directly on your materials.



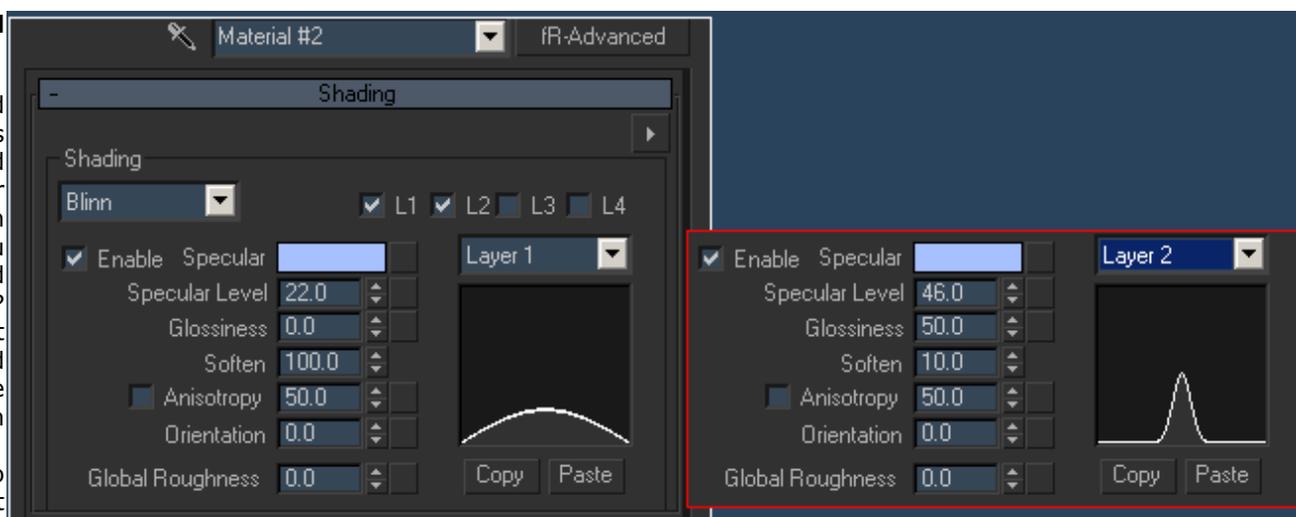
■ fR_advanced settings

As renderer rollouts, fR_Advanced material got fast access to saved settings, for each single rollouts or full material. This set-up is done with one clic (confer the top right arrow on each paragraph of this article)



■ Multilayered Specularity

3dsmax got a standard two specularity layers material. fR_advanced support four specularity layers with all shading maps. You will think, hmm well, did four one was essential? Maybe not, but at least two was essential, and that's right that more than two is usefull in certains cases. Nothing really hard to understand how it works, but it allow you to quickly setup metallic shaders such as car_paint, skin shaders, etc. With a bit of reflection, we can have polished surfaces look.



■ Reflections / Refractions

fr_advanced allow you to control reflections and refractions with high efficiency. It support IOR for fresnel reflect and refract effect, but also control reflections by custom curve.

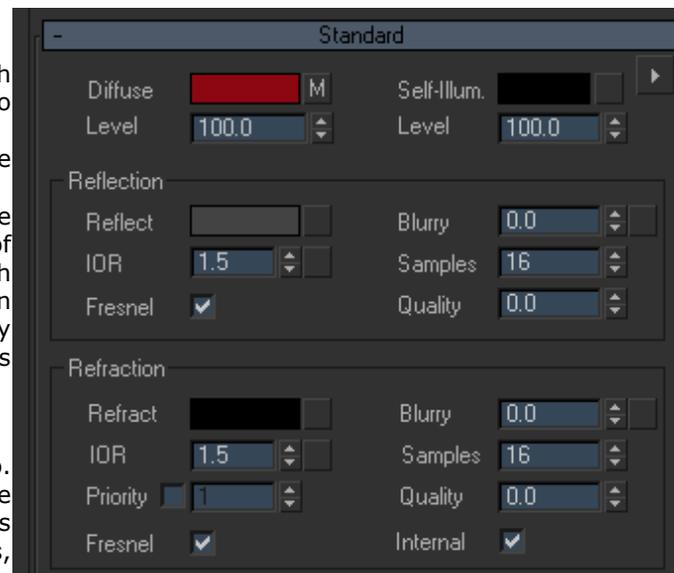
The levels of reflections and refractions are color picker, which is more precise (0-255 against 0-100) but si specially usefull to color the effect.

You will also find the parameters for glossy reflections and refractions, where blurry control the level of blur (0=sharp) and Samples control the number of extra samples casted by the raytracer for the effect. Quality act as with fr_image. Its value fix a threshold for the quality of the rendering, and if an aera doesn't contains enough samples to reach this quality, it automatilly cast more samples. Some sort of automatic "where needed" samples generator.

Note that Stage1 also anisotropic reflections !

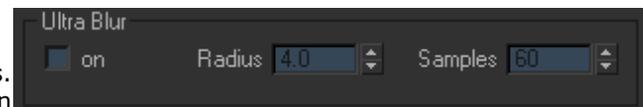
■ A very usefull function is **Priority**. Imagine you get a glass with liquid into. If the liquif border faces and internal glass border faces are coplanar, the renderer doesn't know which face to hit at first. It result some triangles (faces) artefacts, as sometimes the liquid is taken first, sometimes the glass, etc. The same happend when the liquid border is inside the glass border.

Stage1 solve this with this priority option. Just set a higher priority for the glass than liquid one, and no more problems.



■ UltraBlur

Ultrablur is a fast/less accurate method to render glossy reflections/refractions. It use GeomSampler to speed things, which works great ! It is of course an option ! On the other hand, this method doesn't support kind of mirroring effect.

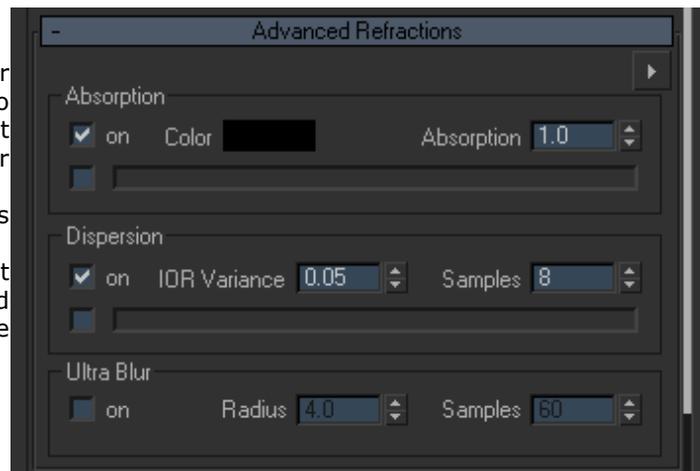


■ Dispersion

Dispersion is the phenomenon which separate a ray into different color rays. This due to the different refraction indices (IOR) per wavelenght, so blue haven't the same ior than red for instance. Then, the rays aren't derivated from the same angle, which result in a light decomposition, or dispersion !

In Stage1, you just got this ior variance to set (and samples send for this effect of course).

You can also use a [gradient](#) to manually set this decomposition effect along the rays. The center of the gradient correspond to the no dispersed effect (no color variance. Then the ray will be separated and take the colors of the gradient, from it left to its right.

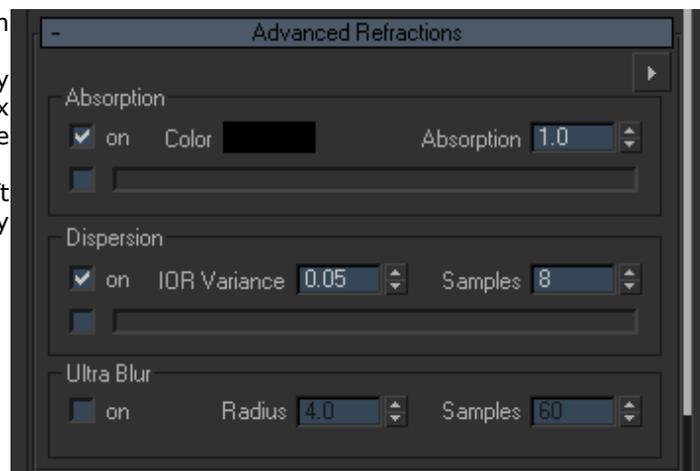


■ Absorption

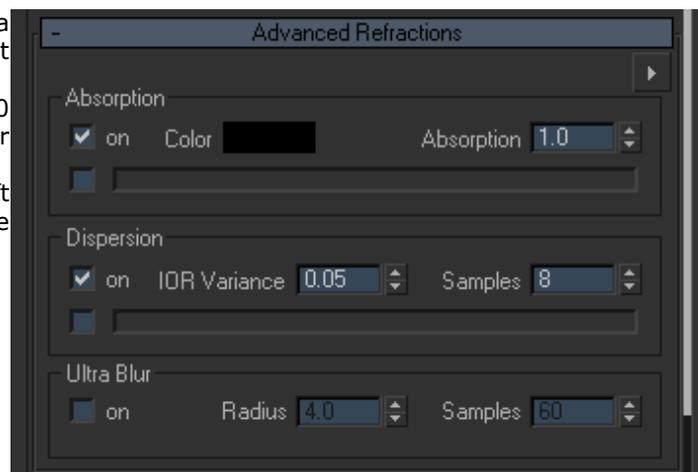
■ Réflexions : This function produce tha attenuation of the reflection on the surface of the object, accordingly to object/reflected object distance.

The color define which color the ray will takes when it will be completely absorbed, Absorption act like a multiplier for the effect, and the max distance act like a cut out for the effect. Max distance allow you to see environnement map without having to calculate the effect till infinity.

You can also control the color of the ray by a [gradient](#), where left correspond to the impact on the surface and the right to the color taken by the ray when it is at the max distance.



■ **Refractions** : This function simulate the absorption of light by a semi-transparent medium. A ray travelling through a dense medium lost some energy and can be totally "absorbed" before leaving it. In Stage1 function, the color define the color taken by a ray when it is 100 absorbed, and the value control the amount of absorption. The higher value will produce more effect. A **gradient** can also defines how the ray act in the medium. The left correspond to the ray entering into the medium, the right to its complete absorption or leaving the medium.



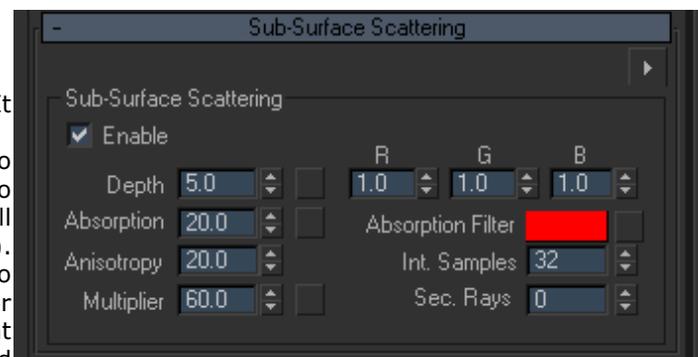
■ **Sub Surface Scattering**

The Stage1 SSS is really usefull, regarding controls and speed. You just have to check it in the material to make this effect rendered. It works with the GeomSampler, which can drastically speed up things !

■ The *Depth* define the maximal lenght of a ray into the medium. Once into the medium, the ray diffuse itself into the medium, accordingly to *Absorption* parameter. This diffusion can be sperical (homogeneous in all direction), or anisotropic, which define Anisotropy parameter (0=isotropic). Then, other parameters allow you to multiply the effect (*multiplier*), to colored it (we usually use a more saturated version of the diffuse color, for instance a red for the skin). We can also make R, V, B rays have different lenght into the medium. For instance, the blue rays will go farther than red ones.

You then get the standard Samples parameter (Int Samples), which set the number of samples dedicated to the 3S. The Sec Samples parameter allow the raytracer to cast more rays from the rays which enter into the medium. Using this is a bit slower, but allow smoother effects.

All these parameters are mappable, giving you real flexibility.



■ **Zauner**

The Zauner shader is totally new in 3dsmax, and really powerfull, even if we can solve many shaders with other shading algos. This Zauner use the standard curve tools of 3dsmax to set the diffusion of the light in Diffuse and also Specular layer of your shader ! You can then define your own shading, creating all sort of shaders like cloths, specials metal, or inexistant materials.

■ ■ **Note : GeomSampler**

The GeomSampler create a matrix of points (or samples) from a mesh. This matrix will be use to render effects such as Ultrablur and SSS. The advantage is to not calculate the effect on the whole object, speeding things up. The degree of interpolation is of course customizable, in Geom settings. This settings also exist per object, in fr_properties.

In **Absolute** mode, you define the maximal amount of samples (Max. Samples) in the matrix. Personnally, I got a default value of 1500, and increase it if needed.

In **Relative**, you define the distance (Smp. Radius) between each sample.

Iterations is the number of pass done by Geom to place the samples on the meshes.