

Light Path Expressions

This page provides information about Light Path Expressions.

Overview

Light Path Expressions or LPEs are a very powerful and advanced tool for extracting specific lighting events from the scene to a separate channel. This allows for a very fine control of the image in compositing. For example, LPEs allow capturing only self-reflections, or the 1st bounce of GI, or the SSS that's only seen behind glass and similar for compositing control of only this aspect of the image.

The LPE syntax is based on regular expressions. Expressions describe a light path that starts from the camera and bounces around the scene until it reaches a light source.

The scene setup is similar to the Light Select workflow. As LPEs are a mode of the Light Select, the expression will capture contributions of the light that is added to the Light Select set. If the Light Select is empty, the expression will extract contributions from all scene lights. LPEs also allow extracting information from the environment, for example allow capturing the GI that comes from the environment only.

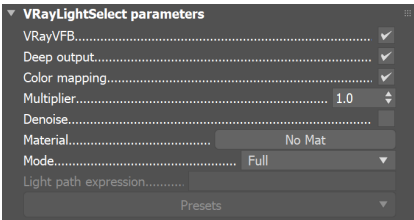
We've added a list of the basic symbols for constructing a Light Path expression.

here is a dedicated LPE Builder available to help you compose expressions and track exactly which ray paths they capture.

Additionally, you can see what expression should get you the equivalent of some of the already available render elements (like Beauty, Lighting, GI, Light Select types etc.).

It is faster and more efficient to use the already available render elements instead of their LPE equivalents in the presets, of course - the examples are there as a point of reference.

Finally, there's some Misc and masking LPE examples, e.g. to capture the GI coming from the environment or to get the GI coming from a given light bounced off of a given object marked by an extra attribute.



LPE Symbols

The LPE alphabet consists of the symbols representing a ray event/type and additional regular expression symbols (".", "+", "*", "<", ">", "[", "]", "|", "?", "^" and additional label strings).

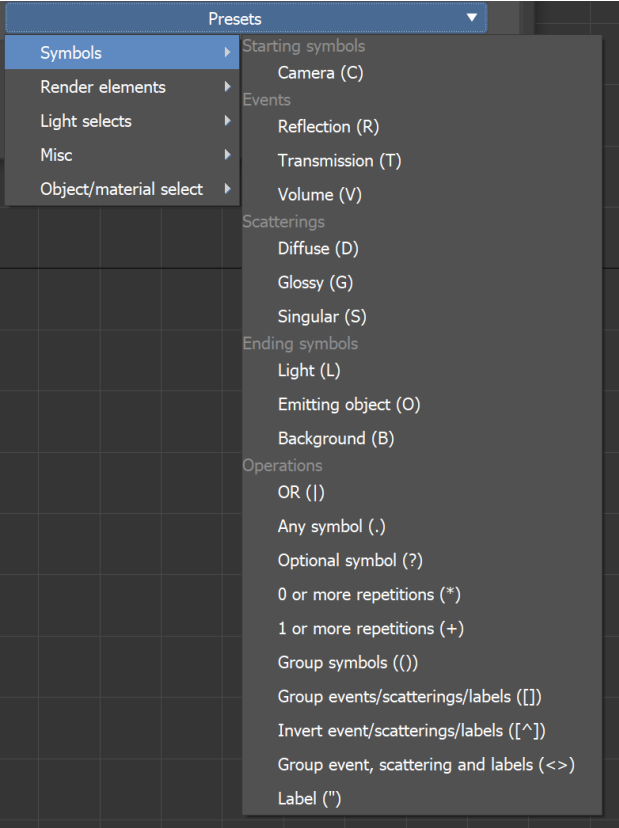
A valid expression needs to start from the camera (C), capture ray spawn or scattering events and end at light (L), emissive object (O) or the environment (E).

Ray spawn events other than C can be combined with scattering types (e.g. <RD> - capture only diffuse reflection) to get a more specific ray event or they can be used directly (e.g. R - capture reflections of any scattering type. This is also equivalent to <R.>)

Ray termination events can also be combined with each other when you want to capture the contribution of a light together with emissive objects, e.g. C<RD>.*[LO] will capture the GI coming from lights or emissive objects.

Sym bol	Description	Type	Fi nal
Initial ray spawn event			
C	Camera ray	Initial ray spawn event	No

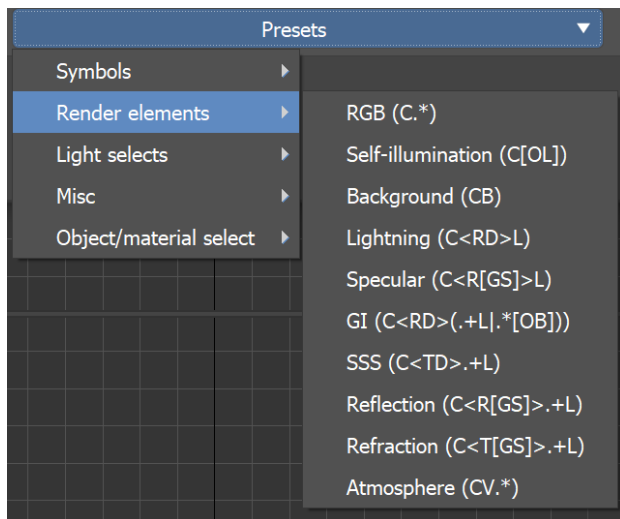
Ray spawn events			
R	Reflection ray	Ray spawn event	No
T	Transmission ray	Ray spawn event	No
V	Volume ray	Ray spawn event	No
Scattering types			
D	Diffuse scattering	Scattering type	No
G	Glossy scattering	Scattering type	No
S	Singular scattering	Scattering type	No
s	Straight (no) scattering	Scattering type	No
Ray termination events			
L	Light hit	Ray intersection event	Yes
O	Emitting object hit	Ray intersection event	Yes
B	Background hit	Ray intersection event	Yes



Render Elements

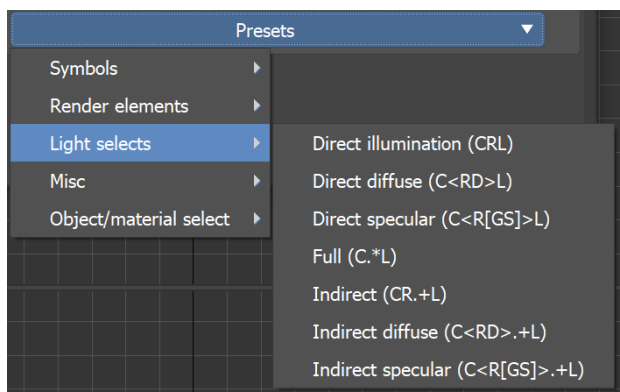
Preset	Light path expression
Render elements	
RGB	C.*
Self-illumination	C[OL]
Background	CB
Lighting	C<RD>L

Specular	C<R[GS]>L
GI	C<RD>(.+L . *[OB])
SSS	C<TD>.+L
Reflection	C<R[GS]>.+L
Refraction	C<T[GS]>.+L
Atmosphere	CV.*



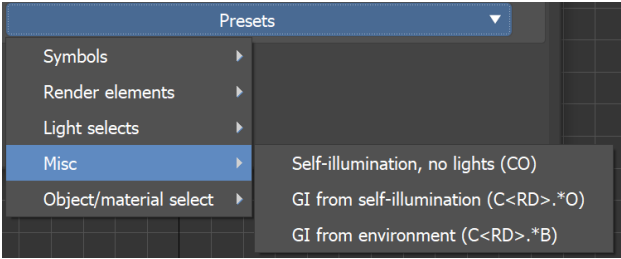
Light Select

Preset	Light path expression
Light selects	
Direct Illumination	CRL
Direct Diffuse	C<RD>L
Direct Specular	C<R[GS]>L
Full	C.*L
Indirect	CR.+L
Indirect Diffuse	C<RD>.+L
Indirect Specular	C<R[GS]>.+L



Misc

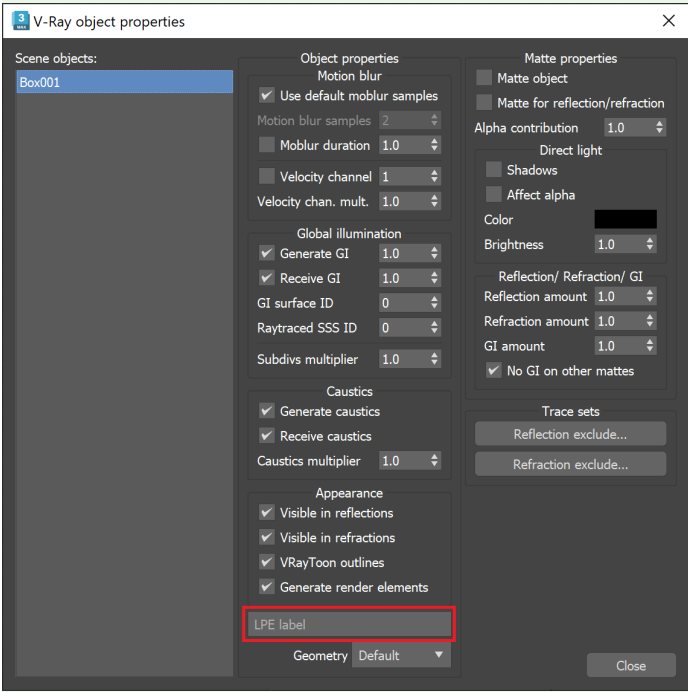
Preset	Light path expression
Misc	
Self-illumination, no lights	CO
GI from self-illumination	C<RD>.*O
GI from environment	C<RD>.*B



Object/material select

Preset	Light path expression
Object/Material select	
Indirect for the object label "obj1"	CR'obj1'.+L
Indirect for all object labels but "obj1" and "obj2"	CR[^'obj1"obj2'].+L
RGB for material "Material #01"	C.'mMaterial #01'.*

In order to use Object select, an object label can be set in the **LPE label** field in V-Ray Object Properties window. When Material select is used, materials names are used as labels.



Presets

Symbols

Render elements

Light selects

Misc

Object/material select

Indirect for object label "obj1" (CR'obj1'.+L)

Indirect for all object labels but "obj1" and "obj2" (CR[^'obj1'obj2'].+L)

RGB for material "Material #01" (C.'mMaterial #01'.*)