



M A X W E L L R E N D E R

Maxwell plugin for Modo R2

Plugin Manual

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Introduction

We are glad to introduce **Maxwell plugin for Modo R2** – a plugin interface between Next Limit Maxwell Render and Luxology modo, allowing users to render their modo models and scenes with Maxwell Render.

Maxwell plugin for Modo R2 is the perfect solution for exporting modo scenes to the Maxwell high-end render engine. Modo and Maxwell together is what you really need if you want to make exceptional quality life like images.

Maxwell plugin for Modo R2 can export complex modo scenes to Maxwell Render in a blink. What's more, you can set the Maxwell specific parameters inside modo and save them with your modo scene.

Key features

Complex scene export from modo to Maxwell

Support for modo mesh deformers (MDD, Morph, Vertex map)

Multiple UV maps

Automatic UV map conversion from modo projected textures (Planar, Cubical, Box, Cylindrical, Spherical and Front projections)

Export items with Maxwell Motion Blur

modo Instance and Replicator export

Camera export with Maxwell specific parameters

Environment export (automatic/manual)

Maxwell Environment inside modo

Automatic material conversion

Maxwell Material item (assigns "*.mxm" materials to modo items)

Light export (emulates modo lights with emitter objects)

Modo Procedural Texture export (with automatic baking)

Maxwell FIRE - Interactive Preview inside modo

Maxwell Proxy Item

Workflow

Our aim was to combine the excellent modo workflow with the superb quality of Maxwell Render.

Just start your work in modo as usual. Create the scene models, set UV maps, create modo materials with textures, adjust lights and environment settings to achieve the preferred scene mood and after that you can fine tune the scene with the integrated Maxwell items and parameters.

Automatic conversion

The plugin provides automatic conversion for most of the modo settings. It means you don't have to set Maxwell environment, plugin converts your modo environment to the appropriate Maxwell environment. You don't have to create Maxwell materials because the plugin converts your modo materials to Maxwell materials. It is very simple, just click and go. The benefit of this automatic workflow is that your Maxwell Render will follow your modo scene very closely. This means you can preview your settings with the modo preview render engine, and enjoy the top quality of the rendered Maxwell image.

Manual settings

Automatic scene conversion is just the beginning. If you want to use the full Maxwell power, you have to set at least some of the Maxwell parameters and most of the Maxwell materials manually. The modo plugin attaches Maxwell parameters to the modo scene items, and provides its own Maxwell items for the better integration. With the attached Maxwell parameters you can fine tune the modo items (camera ISO, shutter speed, object visibility, etc.), and for more complex tasks you can add our Maxwell items. Currently the plugin provides two Maxwell items: **Maxwell Environment**, and **Maxwell MXM**. These items are tightly integrated into modo. With Maxwell Environment item you can control the environment settings just like in Maxwell Studio, and you can also use the advanced Maxwell Physical Sky inside the modo render engine! Maxwell MXM item provides great control over the referenced MXM materials.

Installation

The installation of Maxwell plugin for Modo R2 is a very easy and straightforward process but there are some things to consider.

System requirements

Before you begin the installation process make sure that Luxology modo 501 SP3 (or newer version) is installed on your computer.

It is also recommended to install Next Limit Maxwell 2.6 or newer version before you start the plugin installation.

Supported Luxology modo versions

modo 501 SP3 (minimum) - Windows 32/64 bit, Mac OSX 32/64 bit.

Supported Maxwell Render version

Maxwell Render 2.6

Installation on Windows

Once you download and decompress the zip file, you have to double click on the **Maxwell plugin for Modo R2 2.6000_setup.exe** file. If modo is running, please close it first!

Follow the instructions of the Setup Wizard: select the Destination Location, choose the appropriate plugin version (32 or 64 bit), and type the name of the Start Menu Folder. That's all you have to do, the installer will take care of all the other things.

Note In case you have a previously installed plugin version, the installer will run in update mode. The update mode is even simpler than the normal installation mode, it uses your original installation settings to update/repair your plugin version.

Installation on Mac OSX

Once you download and decompress the dmg file, you have to double click on the **Maxwell plugin for Modo R2 2.6000** package. If modo is running, please close it first! The installer installs the plugin into the '/Users/<your user name>/Library/Application Support/Luxology/Plugins/Maxwell plugin for Modo R2' directory. If there is a previous installation, the installer removes it, but it keeps the content of the 'Default Export' folder.

What's new in R2

Background

Modo plugin was originally designed for modo 302. 302 was the first modo version with SDK plugin interface, a very simple SDK with only file export/import functions. With the development of the first version of the plugin we have tried to overtake the SDK limitations to be able to release a complete plugin. Modo 401 has opened some doors but it was still very limited for plugin developers.

With modo 501 Luxology has made the modo SDK more robust, more open for 3rd party developers. Besides the file i/o functions it is possible now to extend the modo capabilities with our own commands, item types, etc. It doesn't mean everything is possible now, but we have much more options to make a better and more integrated Maxwell plugin.

The new plugin is not just an update; it is a rewritten, redesigned plugin version - **Maxwell plugin for Modo R2**.

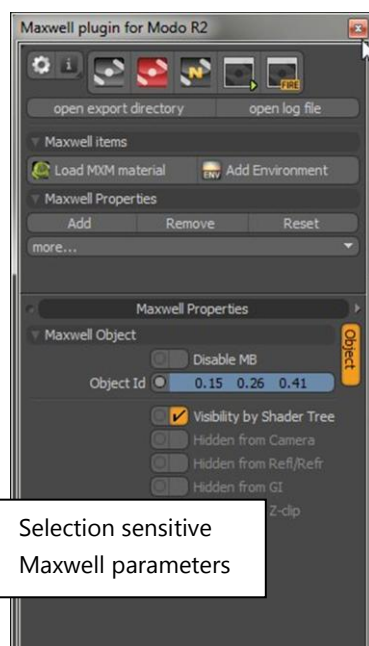
Note Because of the deep changes on the plugin workflow most of the Maxwell parameters saved with the previous plugin versions are obsolete!

What has been changed

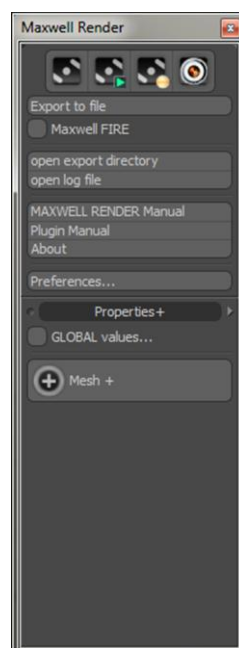
The main concept is still the same; plugin exports most of the scene items automatically, user has to set the additional Maxwell parameters/items only if it is needed to reach the final Maxwell quality. (We still recommend you to use MXM material files for the final image rendering, although the automatic material export can provide good results in many cases.)

The center of the plugin interface is the Maxwell Render plugin window. We have reorganized the window layout to make it as compact and clear as possible. In the top half of the window you can reach the main plugin commands in the lower half you can adjust the Maxwell specific item properties.

Modo 501



Modo 302/401



Maxwell Properties (Properties +)

Internal handling of the Maxwell item parameters has been changed fundamentally in the new version. In modo 501 plugins can define their own item packages. It means we can add Maxwell packages to the modo items - we don't have to add user channels one by one or define additional item tags for the scene items. It is a more flexible more easily manageable and on the whole a much better solution.

By default plugin adds these Maxwell packages automatically to the scene items, but it is possible to turn off the automatic mode and add/remove or reset these packages by hand. (Please check the "Add", "Remove", "Reset" and "more..." buttons in the plugin window.)

In **Maxwell plugin for Modo R2** plugin item parameters are selection sensitive. You don't have to click on the "Mesh +", "Camera +", etc. buttons to bring up the property pop-up window, Maxwell parameters appear in the plugin window as soon as you select an item.

For some Maxwell parameters we have created advanced controls. For example camera Shutter can be adjusted with the Shutter value and also with the Shutter Angle value as it is in Maxwell Studio.

Polygonal object export

Maxwell plugin recognizes modo items with renderable geometry, and converts them to polygonal objects automatically. It exports polygonal meshes, subdiv surfaces, static meshes, gear items.... and it works (theoretically) with any 3rd party geometry (we can't be sure without further testing the actual geometry). In case of complex geometries (for example subdiv surfaces) the export process is about 4-6 times faster compared to the previous version.

Replicator export

The new replicator export function uses the native modo Replicator Freeze function during the export process. It means the end result is 100 percent identical to the modo scene replicator, and yes it can export replicators with Surface Generator source too. Unfortunately it is slower than our previous replicator export solution (maybe later we will add our previous exporter too - as a selectable export option for replicators).

Maxwell FIRE

Maxwell FIRE works more smoothly and the whole system is more responsive under the new version of the plugin.

User can tweak camera parameters, environment settings, item positions and scene mxm materials interactively. In Release 2 it is also possible to follow changes on the Shader Tree settings without restarting FIRE (in case of Texture Locator or Procedural Texture changes you still have to restart FIRE).

Texture export

Plugin can export Procedural Textures and 3rd party texture layers too. Textures are baked to 2D images during the export process. (Solid projection mode is not supported.)

Maxwell Environment

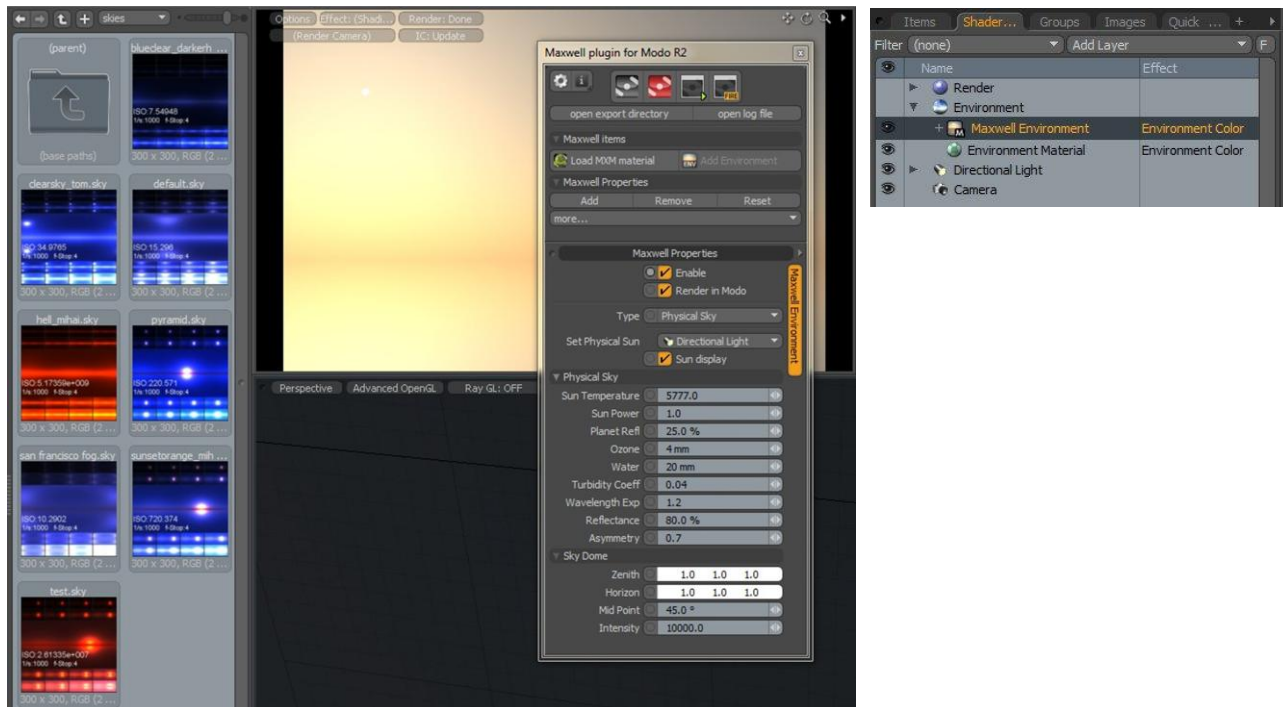
In the previous version of the plugin Maxwell environment parameters were added directly to the modo Environment Material item. Maxwell environment effect was totally invisible inside modo, although the plugin provided an option to create environment test image for the modo scene.

In Release 2 we can add **Maxwell Environment** as a new item to the modo scene. Without Maxwell Environment item plugin exports the scene with the automatically converted environment. For more advanced environment control you can add our new Environment item and adjust the Physical Sky, Sky Dome parameters in a similar way as you can do it in Maxwell Studio.

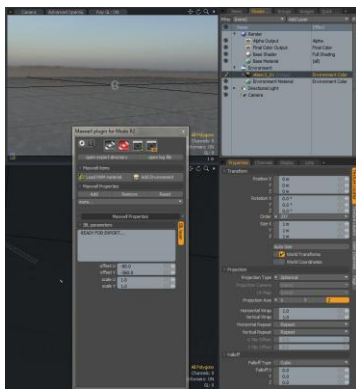
The new Environment item is visible inside the modo preview viewport because the modo render engine can handle it. It is a really nice feature because Maxwell Physical Sky can be used with the native modo render engine too!

You can add Maxwell Environment item from the Shader Tree (Add Layer > Maxwell > Maxwell Environment), or you can click on the Add Environment button in the plugin window.

Maxwell Environment in modo Preview Render



Maxwell IBL Environment



In modo it is very easy to setup a HDRI scene; you only have to add a HDR image map on top of the environment material. You don't have to do anything more to set up an IBL environment! Our plugin converts environment image layers automatically to IBL environments.

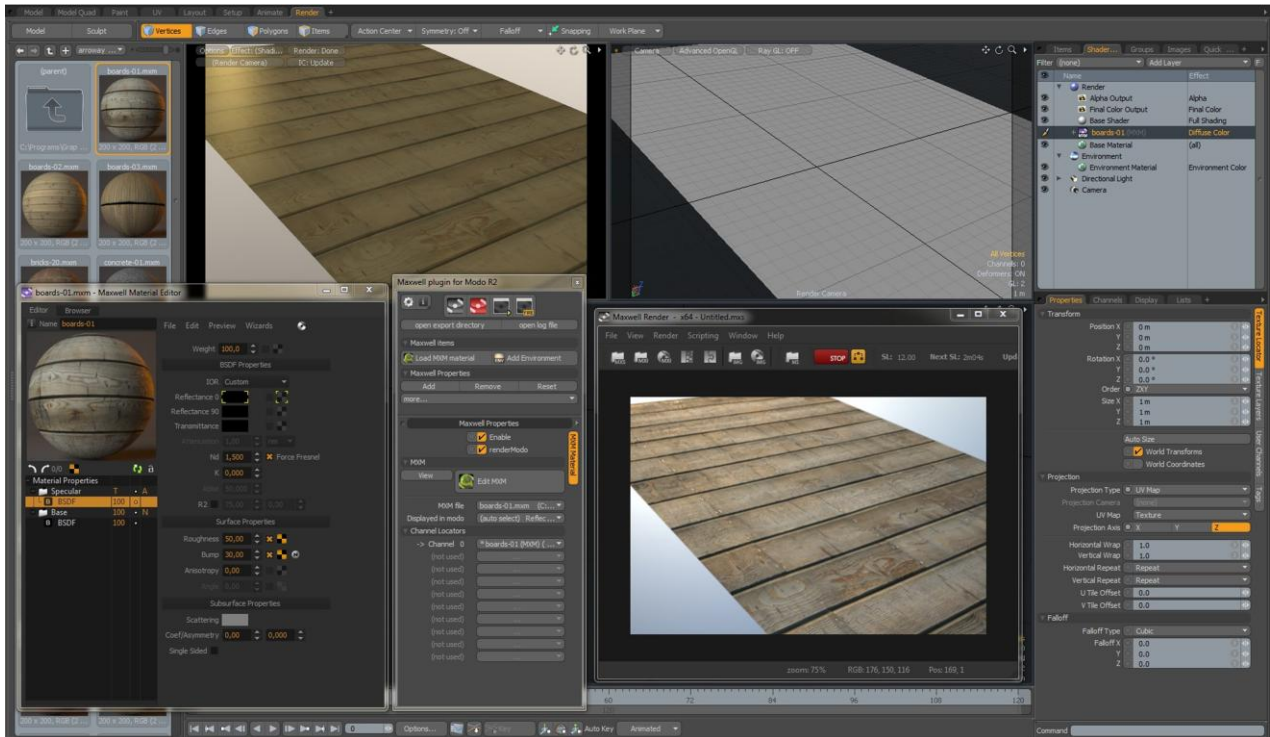
Plugin R2 can handle modo scenes with multiple Environment items. You can add different HDR images to the different Environments, and control the IBL layers with the Environment visibility settings.

In the Maxwell Properties viewport you can follow the exported IBL offset and scale parameters or read about incidental export problems.

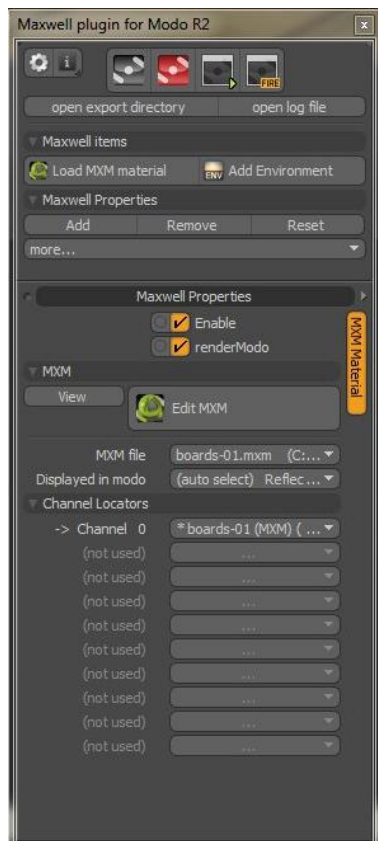
Maxwell MXM materials inside modo

MXM material handling has been changed in a similar way as it was shown with the Maxwell Environment

Maxwell MXM material in modo



In the previous plugin version you had to define mxm materials in the "Replacement mxm" parameter of the modo material item. The mxm material was not visible in modo, and it was complicated to pair mesh uv maps or projected uvs with the texture channels of the mxm material file.



Now **Maxwell MXM** is a new item type in modo. User can add mxm material items to the Shader Tree as a normal texture layer, and it is also possible to drag and drop mxm materials from the modo Preset Browser or Load MXM material from the Plugin window.

When you add an mxm material to the scene, the plugin loads it as a clip item to modo, and creates the MXM Material item which handles the mxm clip and provides further controls for it. The mxm file still has to be edited in the mxed editor, but the mxm material textures can be displayed in the modo preview viewport (check the **Displayed in modo** control). With the new Maxwell MXM item you can connect Texture Locators to mxm material Channels directly inside modo.

The connection between the Maxwell MXM item and Maxwell Material Editor (mxed) is live. You simply resave the material in the Maxwell Material Editor and the changes are immediately visible inside modo.

Modo User Interface integration

Quick export (Export as...)

In case the installation was successful modo can save your scene to a Maxwell scene file "*.mxs".

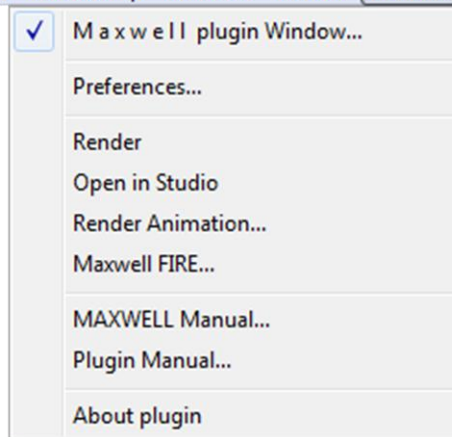
Click on the File menu > Export As... menu item and set Save As Type: to Maxwell MXS (*.mxs). Type the name of the Maxwell scene file and click on the Save button.

Maxwell menu

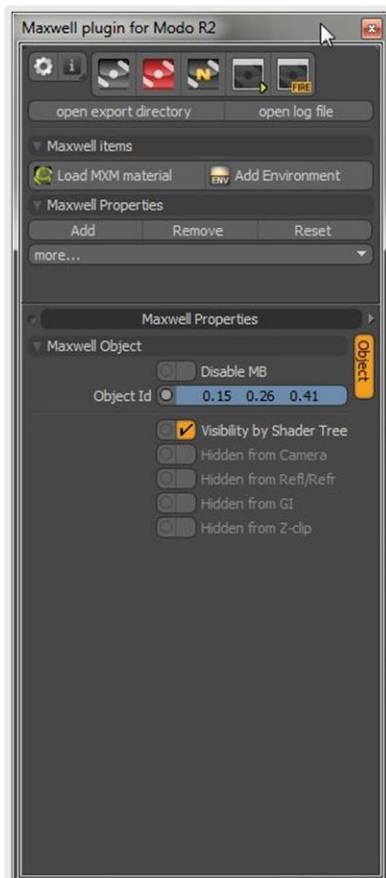
File Edit View Select Item Geometry Texture Vertex Map Animate Render Maxwell Layout System Help

The plugin integrates its own menu item into the modo menu bar.

The menu provides fast access to important plugin commands (you can read more about these in the next section) and you can toggle the state of the **Maxwell plugin window**.



Maxwell plugin window





Maxwell plugin window has two main areas (viewports):

- 1 Render/Export and
- 2 Maxwell Properties

Render/Export

In the Render/Export viewport you can find the main options to render your modo scene with Next Limit Maxwell Render.

- Preferences ... open the plugin **Preferences** window. See sub-chapter [Preferences window](#).
- Info open the plugin **About** box/**Plugin Manual** or **Maxwell Render Manual**
- Start Render export the scene and start render with Maxwell Render.
- Open in Studio export the scene and open it in Maxwell Studio for further tweaking.
- Send Job to Network export the scene and start render with Maxwell Network module.

-  **Render Animation...** open **Render Animation** window. See sub-chapter [Animation window](#).
-  **Maxwell FIRE...** open FIRE window (Fast Interactive Rendering) See sub-chapter [Maxwell FIRE](#).

open export directory open the scene export directory. During the scene export process plugin places the automatically generated “.mxs” materials, environment maps, procedural textures and other things into this folder.

open log file open the export log file which contains important information about what happened during the scene export. The information in this file can help you to eliminate scene errors and incorrect settings.

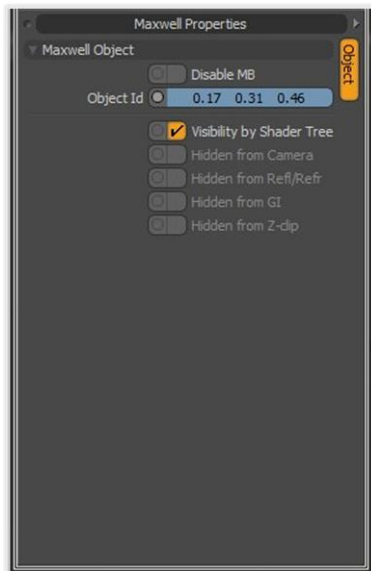
Load MXM material load an “.mxm” material and add the material item to the top of the Shader Tree. You can read more about MXM materials in sub-chapter [Maxwell MXM item](#).

Add Environment add Maxwell Environment item to the scene. (It is active only if there is no Maxwell Environment in the scene yet.) You can read more about Maxwell Environment item in chapter [Maxwell MXM item](#).

Add/Remove/Reset add, remove or reset Maxwell property packages to (or from) the selected items. Property packages are collections of Maxwell parameters. You can adjust these Maxwell parameters in the **Maxwell Properties** viewport.

Note By default the plugin handles these property packages automatically!

Maxwell Properties

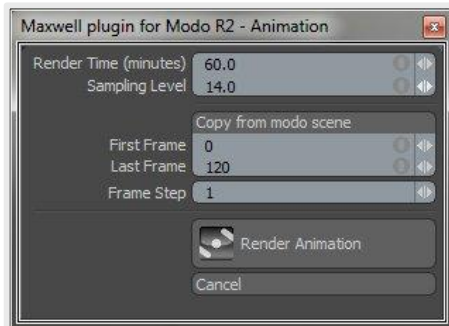


In the Maxwell Properties viewport you can set the Maxwell specific item parameters.

You can think about Maxwell parameters as complementary parameters to the standard modo parameters. You can adjust the normal modo parameters in the modo Properties viewport and in the same way you can adjust the Maxwell parameters in the Maxwell Properties viewport.

Animation window

You can export your modo animation to Maxwell Render as a sequence of "*.mxs" files. It is an automated process, you only have to set the animation export parameters and click on the **Render Animation** button to start the render process.



Render Time (minutes) the maximum number of minutes the render will spend on a frame.

Sampling Level when the render attains the Sampling Level specified here, it steps to the next frame.

Note For animation render you usually use shorter Render Time and lower Sampling Level values. With these controls you can set these values independently from your original (single frame) render settings.

First Frame beginning frame of the animation

Last Frame ending frame of the animation (it has to come after the First Frame)

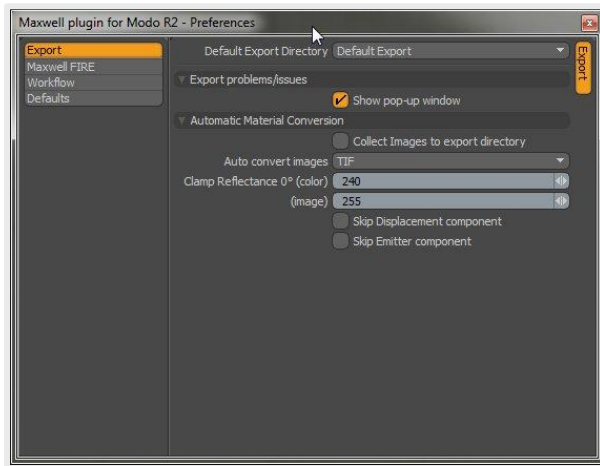
Frame Step the gap between the consecutive frames. Normally it is 1, bigger values are useful for animation test renders.

Tip By clicking on the **Copy from modo scene** button you can set your Maxwell animation values according to the modo settings.

Render Animation export scene animation frame by frame and start Maxwell Render in animation render mode.

Cancel close the Render Animation window.

Preferences window



With the controls in the Preferences window you can customize general plugin behaviors. Preferences are categorized into 4 sub-categories. These Categories are **Export**, **Maxwell FIRE**, **Workflow** and **Defaults**.

Export

Default Export Directory you can choose the place to where the plugin saves the exported Maxwell scene files, textures, log file, etc. This parameter defines the default export location but a scene can have its own location which overwrites this setting (*read sub-chapter [Render Settings](#)*).

The following modes are available:

Default Export: plugin saves the exported files into the `{plugin location}\Default Export` directory. (This mode keeps the scene directory clean.)

Scene Directory: plugin saves the exported files into the scene directory.

(Browse...): you can set a custom directory for the exported files.

Show pop-up window show pop-up window if exporter has sent error or warning messages during the export process.

Automatic Material Conversion

The following settings have effect only on the automatically converted materials!

Collect Images to export directory

Auto convert images some image file formats are supported in modo but not in Maxwell - for example "*.psd" files. The exporter can convert these image files to a Maxwell compatible format. You can choose your preferred image file format from the drop-down list, or set it to disabled if you don't want the automatic conversion. The converted images are saved in the scene export directory.

Clamp Reflectance 0° (color) Maxwell materials with too high Reflectance 0° color value (*close to RGB 255,255,255*) can make your image noisy, not realistic. You have this option to automatically clamp the high color values.

(image) it is the same as the previous control, but it clamps the image pixel color values.

Skip Displacement component skip modo material Displacement components during the automatic material conversion.

Skip Emitter component skip modo material Luminosity components during the automatic material conversion.

Maxwell FIRE

Set parameters for the Maxwell Interactive Engine.

Quality the actual resolution at which the interactive engine renders. Higher value means better quality but slower preview.

Time (s) the time in sec at which the interactive engine stops rendering

Sampling Level the sampling level at which the interactive engine stops rendering

Use Multiple Threads allows the Interactive Engine to use multiple cores. If Use All Threads is off, the interactive engine uses all the available cores minus one. If both Use Multiple Threads and Use All Threads are off, the interactive engine will use only one core.

Use All Threads use all the available threads for the interactive engine.

Displacement enable/disable displacement calculation in FIRE mode.

Dispersion enable/disable dispersion calculation in FIRE mode.

Motion Blur enable/disable Motion Blur in FIRE mode.

Show Status Info show status information (progress status, elapsed time, sampling level) in the FIRE window.

Show Log Info show warning message if Log file contains warnings or errors.

Workflow

Auto add Maxwell packages add Maxwell item packages to the scene items automatically. It is recommended to keep this control on, but - if you want - you can add, remove or reset these parameter packages manually in the Plugin Window.

Defaults

You can set default values for some of the Maxwell item parameters. The change has no immediate effect, you have to restart modo to update these settings.

Light Source Offset this parameter controls how far the light source is in reality from the virtual light model. *You can read about it more in chapter [Directional Light](#).*


Segments (quality) set the number of the polygons of the light object (cone and sphere side). *You can read about it more in chapter [Spot Light](#).*

Maxwell FIRE

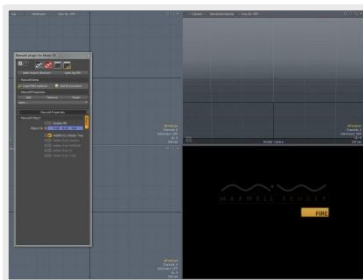
Our plugin integrates Maxwell FIRE (Fast Interactive Rendering) into the modo user interface. With Maxwell FIRE you can follow the scene changes interactively, without the need to restart the export procedure after every modification.

It is similar to the modo native Preview Renderer, but the preview is calculated by the Maxwell Render engine.



Plugin provides a dedicated **Maxwell FIRE** window for the interactive preview display. You can activate it by clicking on  (Maxwell FIRE button) in the Maxwell plugin window.

To start interactive preview, click on the **FIRE** button.



Another option is to switch any modo viewport to Maxwell FIRE viewport. First you have to click on the small arrow at the top-right corner of the viewport, and change viewport type to Card View (from the list select Application > **Card View**). After that click on the arrow again and choose Viewport Settings > **Maxwell Render - FIRE**.

Note “Maxwell FIRE in any modo viewport” feature is not supported in the 32bit OSX (Carbon) version!

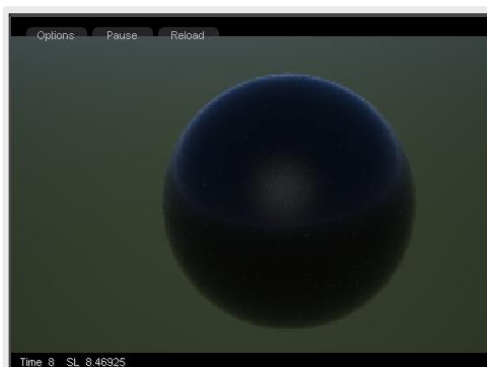
Maxwell FIRE greatly improves scene setup and the overall workflow. If you change item transformation values, material components (mxm and converted materials too), light parameters, environment settings, etc. the FIRE viewport refreshes immediately with the new scene parameters.

In some cases automatic refresh is not possible. In these cases you have to reload the FIRE engine to follow the changes.

You have to reload the engine after these events:

- new geometries, geometry changes,
- uv map changes, texture locator projection changes,
- material mask changes

FIRE interactive viewport has three control buttons: **Options**, **Pause/Start** and **Reload**.



Options opens the Maxwell FIRE preferences pop-up window where you can control the main parameters of the Interactive Engine. *You can read more about these preferences in sub-chapter [Maxwell FIRE](#).*

Pause/Start Pause or Start the interactive preview engine.

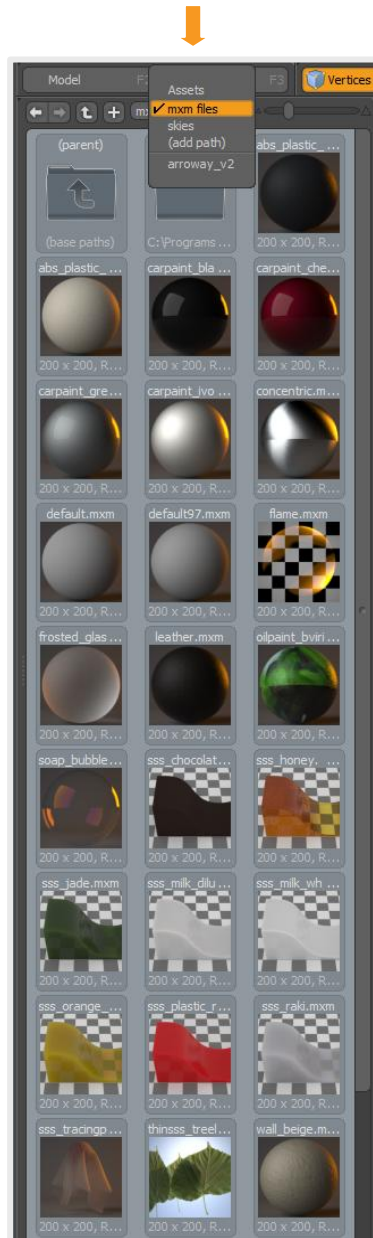
Reload re-exports the current scene, including all the changes.

Integration with modo Preset Browser

You can use modo Preset Browser to add MXM materials or Maxwell Sky preset files to your scene models, environments.

The plugin installer adds the Maxwell Material Database **/mxm files** and **/skies** directories to the modo Preset folders!

Click on the drop down list (middle-top of the Preset window), and select **mxm files** or **skies**.



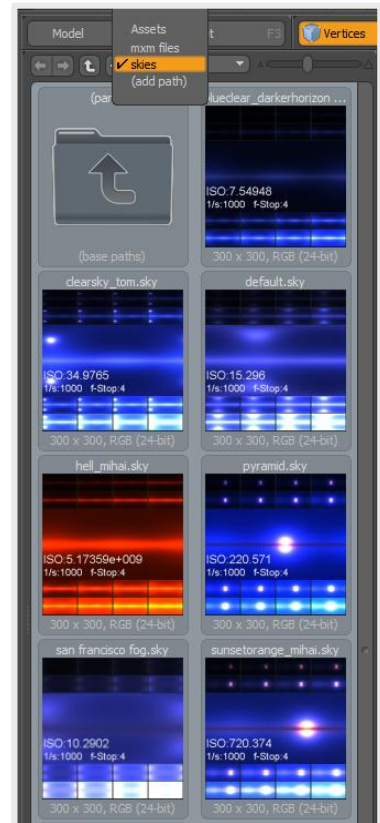
The Presets Browser is very useful if you want to apply your predefined Maxwell files to modo scene elements.

Just drag and drop the preset thumbnails from the Preset Browser onto the modo geometry, Shader Tree, or in case of Sky presets to the render or viewport background. It is very fast and intuitive.

Note You can apply Sky preset by double clicking on the sky thumbnail.

<< On the MXM file thumbnails you can see the material preview image.

Sky thumbnails show Maxwell skies with different intensity settings. >>



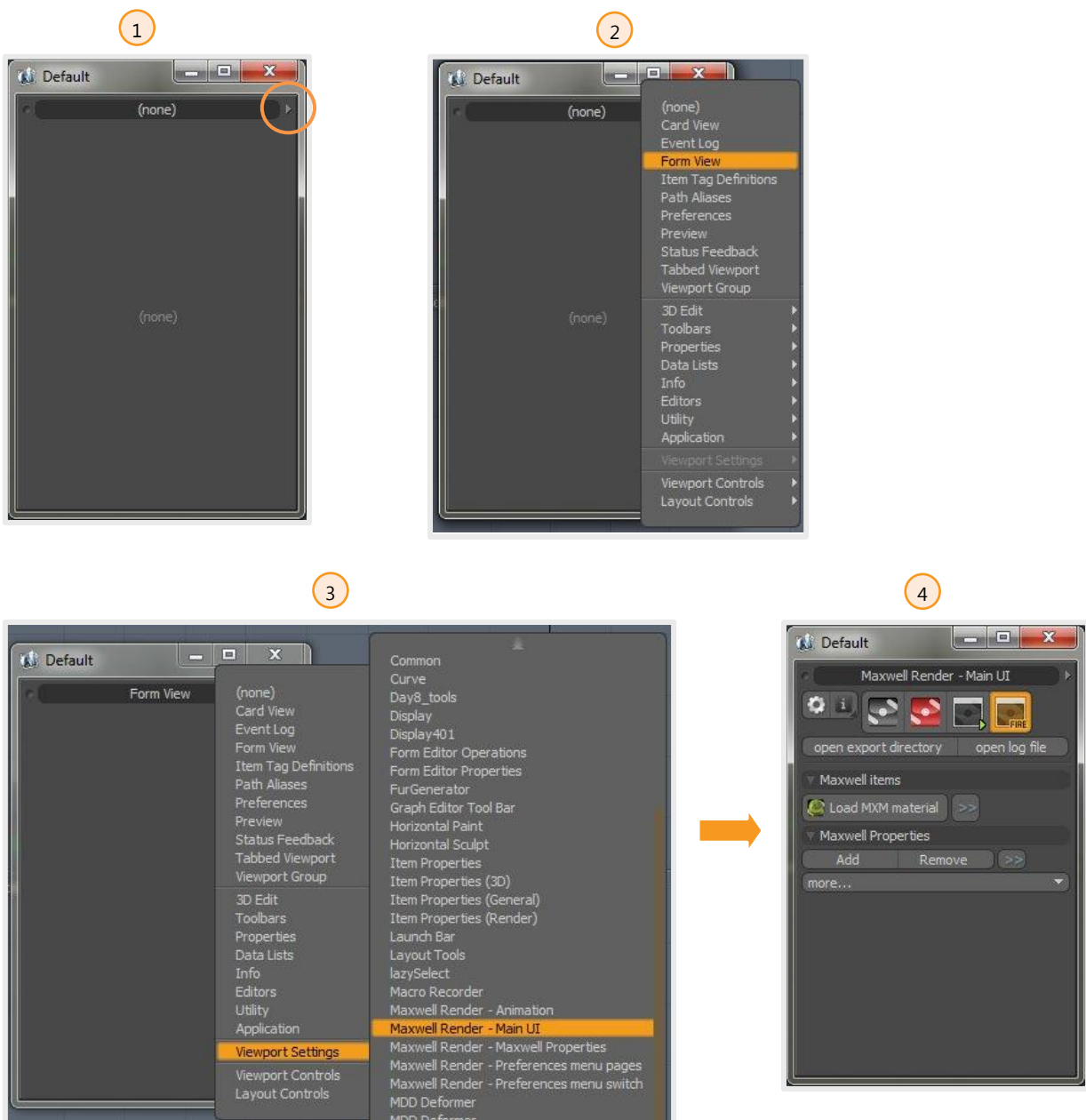
Note Sky thumbnails are generated at fixed f-Stop and Shutter Speed values (f-Stop 4, 1/s 1000). The ISO value varies from image to image to have an exposure value where the widest spectrum of the sky colors are visible.

Customize plugin UI

Modo user interface is well known of its great customizability. You can change any modo viewport to plugin viewport with 4 easy steps.

- Click on the little arrow (top right corner of the viewport).
- From the list choose **Form View**.
- Click again on the arrow and from the list choose **Viewport Settings**. After you click on Viewport Settings, modo opens a new list. In the list you can find the plugin viewports (Maxwell Render – Main UI, Maxwell Render – Maxwell Properties,...).
- Click on the name of the plugin viewport.

If you want to change a modo viewport to Maxwell FIRE viewport, at the second step choose **Card View** instead of Form View, and from Viewport Settings choose **Maxwell Render – FIRE**.



Exporting modo items

In this chapter you can read about how the different modo item types are exported by the plugin and about the available Maxwell item parameters you can play with.

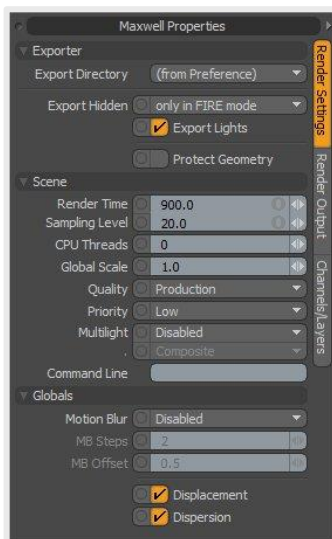
Render

In modo all the scene settings, parameters are connected to scene items. For example you can change render setting by adjusting the properties of the render item. Plugin follows the same logic, Maxwell render settings are connected to the Render item.

To adjust Maxwell Render settings first you have to click on the Render item. In case the render item is selected, you can see the Maxwell render parameters in the **Maxwell Properties** viewport.

Because of the big number of Render parameters we have grouped these into three Form Tabs: **Render settings**, **Render Output** and **Channels/Layers**.

Render Settings



Export Directory export directory is the place where the exporter saves the exported mxs scene, images, etc. files. You can set the default export directory in the Preferences window, but here you can set export directory for the actual scene. If Export Directory is in **(from Preference)** mode, it means the scene doesn't have its own export directory, it uses the global default. If you select **(Browse...)** from the drop-down list, you can set custom export directory for the scene.

Export Hidden in case you want to export your hidden scene items you have to check this control. It is only useful if you want to tweak your scene in Maxwell Studio. If you export your scene directly to Maxwell Render it is better to keep it unchecked, so the exported "*.mxs" file and the render data won't contain the unneeded item data (the export process will be faster).

Export Lights check this control if you want to export/convert your modo lights to Maxwell Render. Although Maxwell doesn't have modo compatible light system, Maxwell plugin for Modo R2 can convert modo lights for Maxwell Render (see chapter [Lights](#)).

Protect Geometry if you export the scene in protected geometry mode, Maxwell Studio won't allow further export from the exported scene file.

Render Time set the maximum render time (in minutes) for the render. The longer the time, the cleaner and more accurate your image will be.

Sampling Level maximum sampling level required. The render will stop when this SL is reached.

CPU Threads number of threads dedicated to the render. By default, 0 means that all available CPUs/ Cores will be used.

Global Scale you can scale up or down the Maxwell scene during the export process. Value 1.0 means the exported items will have the same size what they have in modo.

Quality two different qualities are available: **Draft** and **Production** quality.

Priority you can set the rendering process to normal or low priority. This is useful if you wish to work on your computer while rendering.

Multilight **Disabled / Intensity / Color and Intensity** are the different Multilight modes. You can even choose between exporting all the emitters contribution to independent images (**Separate**), or saving only the composed render (**Composite**).

Command Line pass command line parameters to Maxwell Render. About the available command line parameters please read the Maxwell Manual (Appendix III).

Motion Blur control scene motion blur. You have three options: **Disabled** – no motion blur, **Camera only** – motion blur only from camera movements, **Enabled** – item and camera motion blur.

MB Steps the number of transformation steps the plugin exports for geometry items.

MB Offset you can set when the shutter opens compared to the current frame.

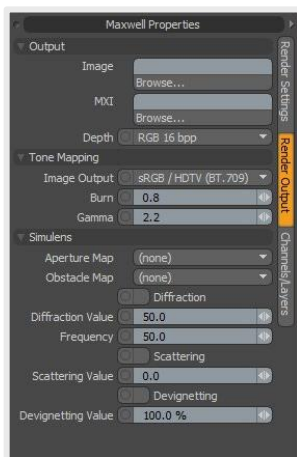
MB Offset=1: Shutter opens before the current frame and closes at the current frame. MB Offset=0.5: Shutter opens before the current frame and closes after the current frame (this is how modo MB works).

MB Offset=0: Shutter opens at the current frame and closes after the current frame.

Displacement enable/disable displacement rendering.

Dispersion enable/disable dispersion rendering.

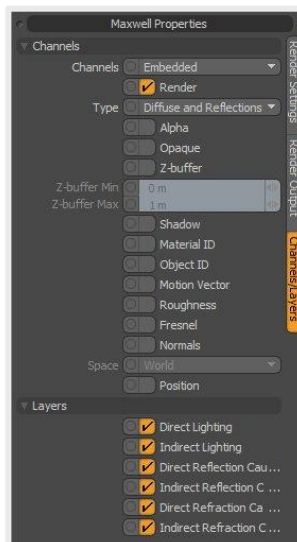
Render Output



The Render Output properties are also part of the normal Maxwell workflow.

Note Please read chapter **Setting Up the Render Output** in the MAXWELL RENDER 2 Manual for further information.

Channels/Layers



The Render Channel and Render Layer properties are also part of the normal Maxwell workflow.

Note Please read chapter **Setting Up the Render Output** in the MAXWELL RENDER 2 Manual for further information.

Environment

Environment export is a good example for how well automatic export can work together with the manual export settings. By default plugin converts modo environment settings automatically. You set the scene environment in modo and the plugin follows your settings and chooses the right Maxwell environment type with the proper parameters.

The conversion happens according to the following rules:

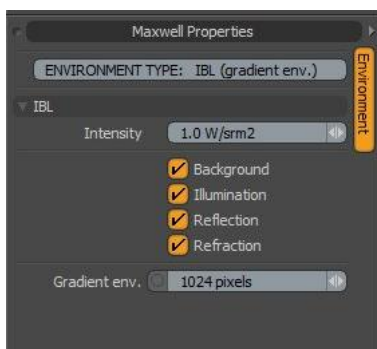
- Modo environment with Constant color or 2 - 4 Color Gradient and Overcast Sky -> plugin creates the environment gradient image according to the modo settings, and set the exported image as IBL environment.
- Modo with Physically-based Daylight -> exported as Maxwell Physical Sky
- Modo with HDR or EXR image environment -> the result is Maxwell IBL environment with the appropriate hdr or exr image file.

Automatic conversion doesn't forget about the virtual sun of the scene. If your scene has Directional Light item with Physical Sun turned on, it will be exported as Maxwell sun.

Note Maxwell allows only one sun in the scene! If you have more modo sun item, the exporter exports only the last one.

If automatic environment conversion is not enough for you (for example you want better control over the Physical Sky settings), you can add our **Maxwell Environment** item as a top layer on your modo environment. With Maxwell Environment item you have similar Environment options what you have in Maxwell Studio.

modo Environment item



We added extra controls to the modo Environment item to make environment conversion easier.

On the top of the Environment tab you can see the INFO line. This INFO line gives quick information about the exported environment type. Type can be **None**, **Physical Sky**, **Dome Sky**, **IBL (image map)** and **IBL (gradient env.)**. Exported environment type is the result of the layer items under the Environment item. For example Environment Material with **2 Color Gradient** type will be recognized as **IBL (gradient env.)**. If you change 2 Color Gradient to **Physically-based Daylight**, or you add a Maxwell

Material item with **Physical Sky** type, the final environment will be **Physical Sky**. If you add a HDR image to the top of the Environment layers, it will change the exported environment type to **IBL (image map)**.

In case of IBL environment types, you have further controls:

Intensity intensity value for the IBL layers (this control changes the intensity of the modo Environment too).

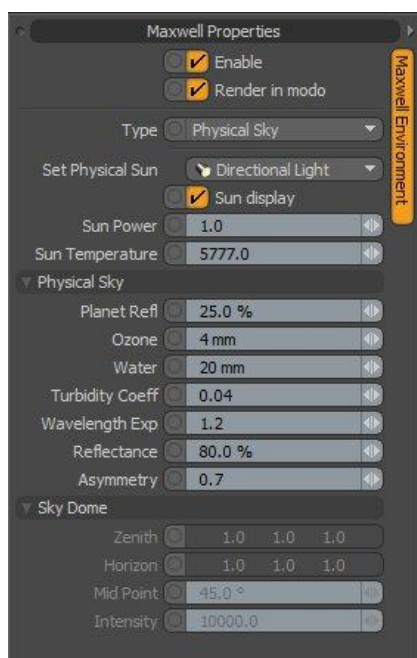
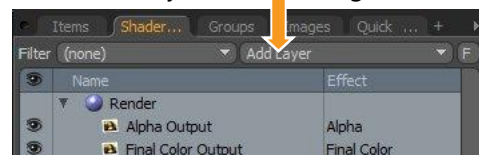
Background, Illumination, Reflection, Refraction enable/disable the effect of the IBL environment on the various IBL layers. (These controls are not independent from the modo environment visibility switches:

Background changes **Visible to Camera**, Illumination changes **Visible to Indirect Rays**, Reflection changes **Visible to Reflection Rays** and Refraction changes **Visible to Refraction Rays**.)

Gradient env. size (in pixels) of the exported gradient image. Use bigger number if you want better image quality, but bigger file means longer preprocessing time in Maxwell Render. *Plugin exports modo Environment Material with Environment type **Constant**, **2 Color Gradient**, **4 Color Gradient** or **CIE Overcast Sky** as an EXR image file. When the file is ready, it sets the new image file for the IBL background layers.*

Maxwell Environment item

Maxwell Environment is a Shader Tree texture layer item. You can add Maxwell Environment layer from the Plugin window (**Add Environment** button), you can use modo Preset Browser (by double clicking on the sky preset thumbnail), or you can add it as a normal modo texture layer by clicking on the Add Layer drop-down button at the top of the Shader Tree (from the drop-down list select Maxwell > **Maxwell Environment**).



Enable enable/disable Maxwell Environment layer.

Render in modo set it to ON if you want modo to display Maxwell Environment in modo preview and final render.

Type type of the Maxwell environment: **None**, **Sky Dome**, **Physical Sky**. In Maxwell Studio you can choose IBL environment too, but in modo IBL environment is automatically converted from modo environment settings (*read next sub-chapter [IBL](#)*).

Sun display switch direct sunlight on/off. (Sky Dome or Physical Sky environments)

Note Please read sub-chapter **Sky Dome** and **Physical Sky** in the MAXWELL RENDER 2 Manual for further information about Maxwell environment settings.



Note You can follow the effect of the Maxwell Environment settings in the modo preview window and you can use Maxwell Physical Sky or Sky Dome with modo render. (If you want to use Maxwell Physical Sky or Sky Dome in a modo render, please make sure **Render in Modo** checkbox is ON.)

IBL

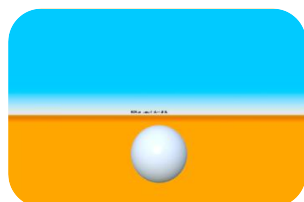
If you want to light your Maxwell scene with High Dynamic Range image(s) you have to set-up the HDR environment as you normally do it in modo. You can use any HDR or EXR image to light your modo scene and with the connected Texture Locator you can position the HDR background.

In most cases the conversion works without your further assistance, but there are some limitations you have to keep in mind.

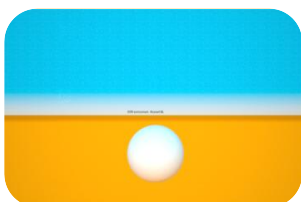
IBL conversion works only with front or spherical projected environment images.

- In case of Front projection the only limitation is that the Projection Camera has to be the same as the render camera.
- In case of Spherical projection it is important to keep the Texture Locator main axis parallel with the modo Up Axis, otherwise the plugin can't find appropriate settings for the conversion. (It is OK to rotate the image around the Up Axis, and it is also valid to flip it upside down.) Further limitations: a) Environment image has to be in 0,0,0 position. b) Environment Image has to be uniformly scaled.

Texture Locator with Front projection



modo



Maxwell

Texture Locator with Spherical Projection

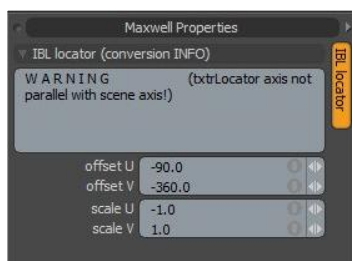


modo



Maxwell

Tip You can use modo Horizontal and Vertical Wrap controls to alter the look of your environment image!



Modo plugin provides live feedback about the HDR image -> IBL conversion in the Maxwell Properties viewport. You can read the exported IBL offset and scale values (these are calculated from the Texture Locator of the HDR image), and if the plugin can't convert the Locator parameters perfectly, it displays warning messages with the conversion problem in the INFO field.

IBL layers

If you want to use different images for the different Maxwell IBL layers (Background, Reflection, Refraction, Illumination), you can follow the normal modo workflow again.



Create two or more modo Environment item (on the picture you can see **Environment (2)** and **Environment**), and with the visibility flags set the scope of the Environment items.

If **Visible to Camera** is on, the HDR image in the Environment item will be exported as IBL **Background** layer.

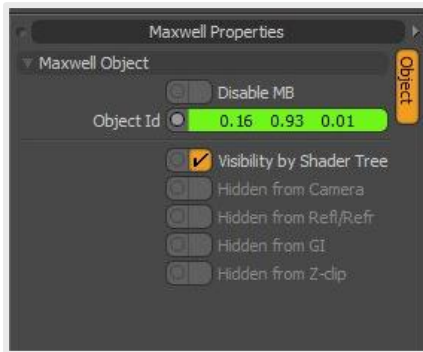
If **Visible to Indirect Rays** is on, the HDR image in the Environment item will be exported as IBL **Illumination** layer.

If **Visible to Reflection Rays** is on, the HDR image in the Environment item will be exported as IBL **Reflection** layer.

If **Visible to Refraction Rays** is on, the HDR image in the Environment item will be exported as IBL **Refraction** layer.

Objects (geometries)

Plugin attaches object properties to items with renderable geometry. These are Mesh items, Static Meshes but other item types too (for example Gear item or other 3rd party plugin items with geometry data).



Disable MB disable motion blur for this item.

Object Id you can set color for the Mesh item. Maxwell Render will render this item with this color in Object ID render mode, so it is easier to manipulate the object in a 2D paint program.

Visibility by Shader Tree sets the visibility options (hidden from camera, reflection, refraction or GI) of the object according to its modo Shader settings.

Note If mesh item has multi-materials with different shader settings, exporter sets the visibility parameters according to the last evaluated modo shader.

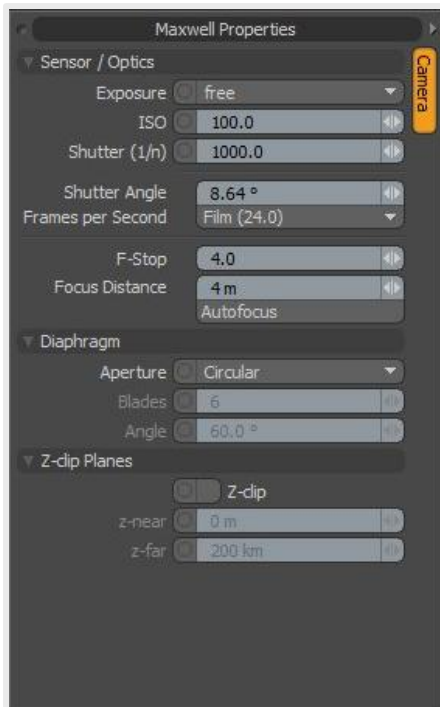
Hidden from Camera hide the object from the render view but allow it to contribute to the render calculation (cast shadows, refract, etc.).

Hidden from Refl/Refr reflected or refracted objects are hidden.

Hidden from GI the object will render but it will not affect lighting.

Hidden from Z-clip the object will not be cut by Z-clip planes.

Cameras

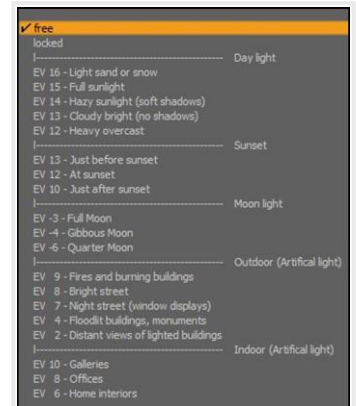


Maxwell and modo Camera objects have many common parameters (*these are automatically exported by the plugin*) but Maxwell has some special parameters.

Note Please read chapter **Cameras** in the **MAXWELL RENDER 2 Manual** for more information about Maxwell Cameras.

Exposure with the Exposure control you can lock the exposure to a certain value or you can switch to useful preset settings.

TIP With locked exposure you can easily control the amount of DOF by changing the F-Stop value.



Exposure List

ISO the film's light-sensitivity, higher ISO means more sensitive film.

Shutter (1/n) the shutter speed or the time light has to reach the film is specified in 1/n of a second. A higher number means the light has less time to reach the film.

Shutter Angle this option allows you to control the amount of motion blur in an image in animations.

F-Stop controls the aperture of the lens. You can change F-Stop at the modo camera properties too.

Focal Distance distance from the camera location to the camera target. The camera target represents the point where your render will be in perfect focus. You can change Focal Distance at the modo camera properties too (it is called Focus Distance there).

TIP If you click on the **Autofocus** button modo automatically chooses the right focus distance for your camera.

Aperture controls the shape of the 'bokeh' effect seen in out-of-focus highlights

Blades the number of blades of 'Polygonal' cameras

Angle the angle of blades in 'Polygonal' cameras

Z-clip enables/disables Camera Z-Clip planes

Z-near the near-plane Z-Clipping distance (must be less than Far Clipping Plane)

Z-far the far-plane Z-Clipping distance (must be greater than Near Clipping Plane).

Materials

Our plugin has complex mechanisms to convert modo materials to Maxwell materials automatically. You can set your modo material, adjust its values (transparency, reflectivity, etc.), add your texture images and the plugin creates the Maxwell material for you. It is so easy!

Automatic conversion is good enough in some situations, but for a really high quality render you have to use real Maxwell materials. Maxwell plugin for Modo R2 can handle "*.mxm" material files, so you can use your own Maxwell materials inside modo or you can download material files from the more than 3000 free Maxwell materials you can find on the WEB.

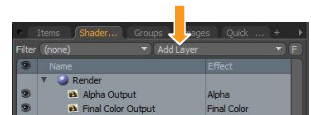
Maxwell MXM item

To handle Maxwell mxm materials inside modo you have to add Maxwell MXM item(s) to your scene. Maxwell MXM is somewhat similar to the Image Map item, but while Image Map connects image clips to the scene materials, Maxwell MXM does the same with mxm files.

Actually the plugin loads the mxm material files into the scene as clip items, and Maxwell MXM represents the mxm file in the Shader Tree and attaches uv maps or texture projection (via Texture Locators) to the textures inside the material file.



You can add Maxwell MXM items to the scene from the plugin window (**Load MXM Material** button), from the Shader Tree (**Add Layer > Maxwell > Maxwell MXM**) or you can drag and drop it from the Preset Browser onto a geometry item.



Enable enable/disable Maxwell MXM layer.

Render in modo set it to ON if you want modo to display Maxwell MXM in preview and final render.

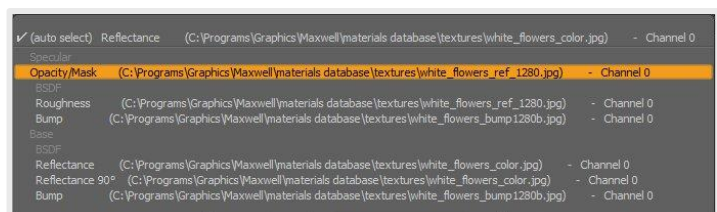
View quick display of the mxm material preview thumbnail.

Edit MXM opens the mxm file in the Maxwell Material Editor.

MXM file the mxm file connected to the Maxwell

MXM item. With this control you can load other mxm files from your computer (**load mxm**), download it from Maxwell web catalog (**load from Web Gallery**) or you can create a new mxm file (**new mxm**).

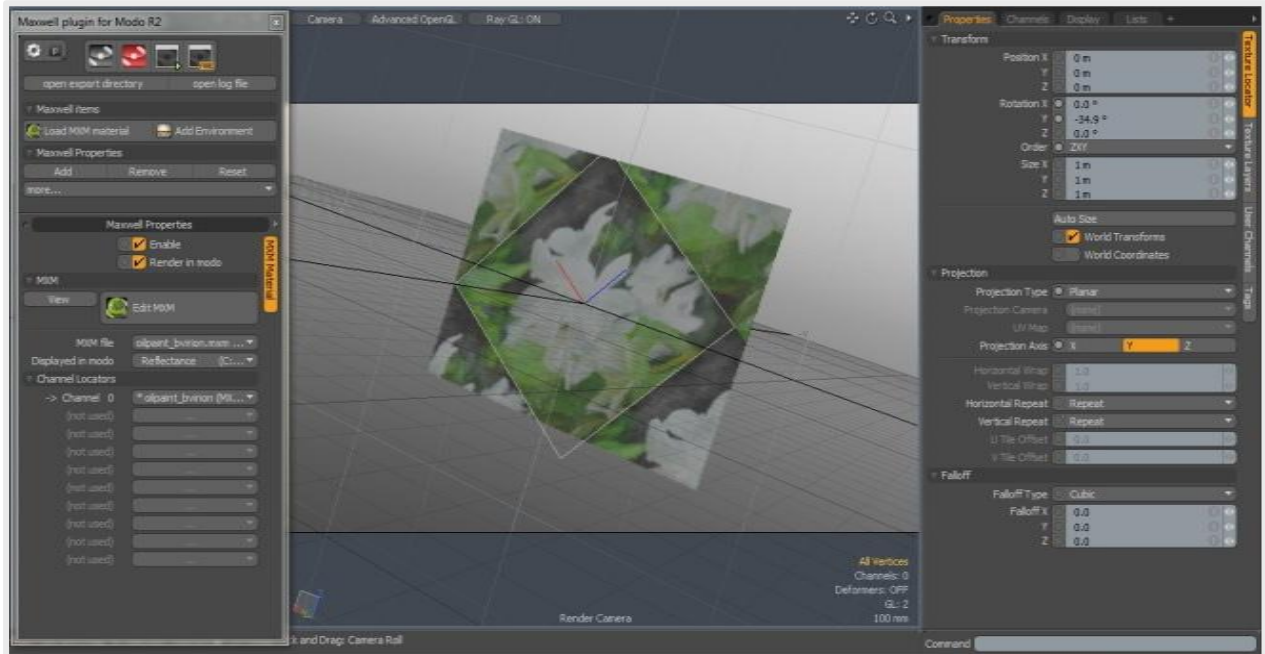
Displayed in modo you can select the material texture you want to display in modo. In the drop-down list you can see the layers and components of the material (bsdf, emitter, displacement, coating) and the available textures with the associated channel numbers. The first item in the list is an automatic proposal from the program (plugin tries to find the most typical texture or color for material display).



Channel Locators

In the **Channel Locators** area you can see the channel ids of the mxm file and the associated Texture Locators. With these controls it is very easy to connect Mesh uvs or projected uvs (via Texture Locators) to the Maxwell materials.

You can follow the uv projection changes in the modo preview render window or in any 3D Model viewport with RayGL.



Note Set the projection mode (and the associated uv map in case of UV Map projection mode) with the Texture Locator. If you want to tile or offset the map, you have to do it with the Maxwell Material Editor > texture window > Repeat / Offset values.

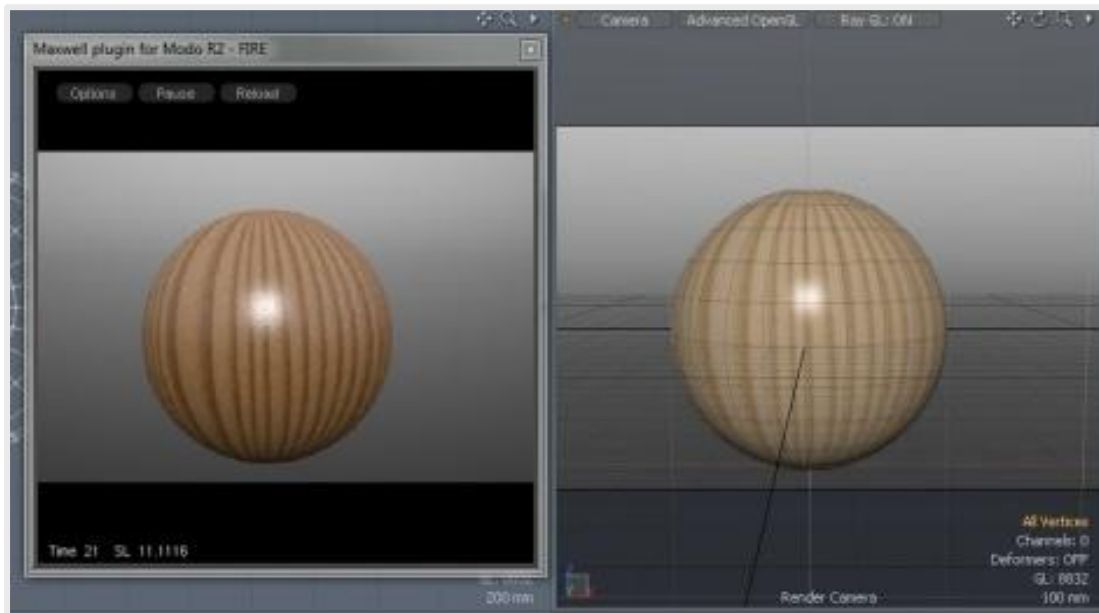


The connection between Maxwell MXM and Maxwell Material Editor is live. It is especially useful if Maxwell FIRE is running and you want to fine tune the material, or if you want to change the uv projection parameters. (In the second case you can follow the changes not just in Maxwell FIRE but in the modo preview window too). After you save the changes in mxed, the material updates automatically inside modo.

TIP It is recommended to use Maxwell Material Editor in **Always on top** mode. You can switch to Always on top mode in the mxed File menu. In this mode the material editor is always visible - it feels as an integrated part to the modo UI.

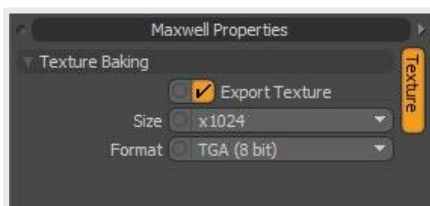
Textures

Maxwell plugin can export modo procedural textures (cellular, checker, wood, and other 3rd party textures) with its texture baking option. If the plugin recognizes an item as a possible procedural texture item, it adds the Texture Baking parameters to the item. With these parameters you can set the appropriate export option for the texture (image size, format).



Texture baking is a relatively slow process. To accelerate the process the plugin stores information about the already exported texture images in a **[LIST]_bakedTextures.list** file (every exported scene has its own list file). The list file works like a cache, plugin bakes the texture file only if it is needed.

Note Automatic texture baking works only with the automatically converted materials!



Export Texture enable automatic texture baking for the Texture item

Size size of the exported texture image.

Format format of the exported texture image.

Note Plugin can't handle **Solid** projection mode. (It uses Cubic projection instead of Solid projection during the export process)!

Lights

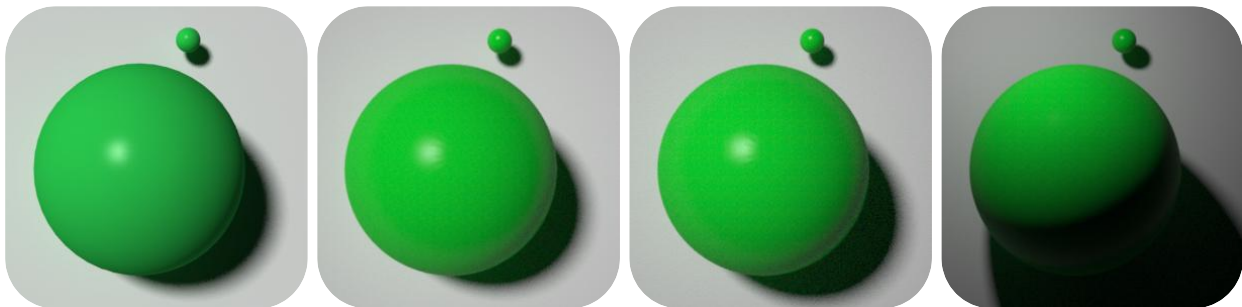
Maxwell Render doesn't have virtual light system as you have in modo, so the plugin has to convert modo lights to Maxwell emitter objects.

Directional Light

The conversion method of the Directional Light items depends on whether you checked the Physical Sun check box or not. In case you use the Directional Light object as a modo sun, plugin uses the location, time information of the modo sun to convert it to sun information for Maxwell environments. In this case the light geometry is not exported.

If it is a simple Directional Light item without sun parameters, plugin converts it as a distant emitter object (small circular geometry) with high emission power values.

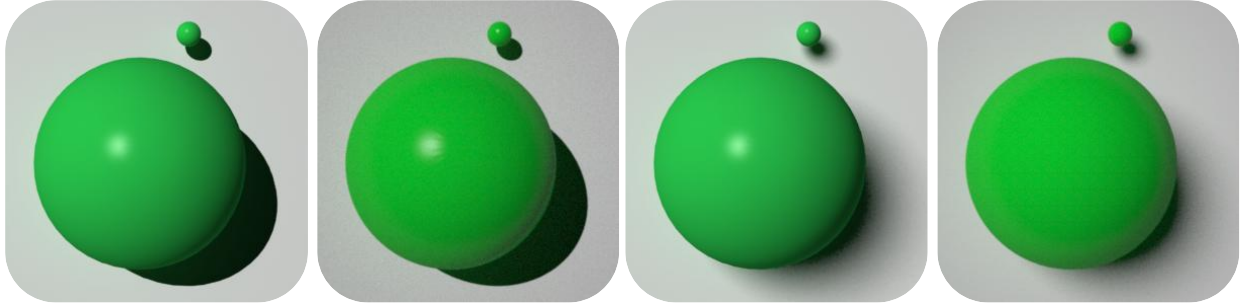
For Directional light export the plugin uses a special parameter: Light Source Offset. (You can change the value of this parameter in the **Maxwell Properties** viewport.) **Light Source Offset** controls how far the light source is in reality from the virtual light model. If you want to have sun like light source, the light object should be really far from your scene center. The default (and recommended) distance is 150 km. From this distance the light rays are almost parallels, and this is how sun light should behave. An emitter object needs very high emission power value to light the scene from this distance, but if you set the distance shorter, lower energy level is still enough. (The exporter automatically adjusts the emission power according to the Light Source Offset value.) Normally the possible biggest distance is what you need, but in case you have other scene lights with much lower emission power values, the high setting of the Directional Light emitter can make it difficult for the render engine to adequately render the weaker emitters. In these cases you have to balance with the Light Source Offset value to keep the right sun light effect, but with the lowest emission power. In the following pictures you can see how this parameter changes the effect of the light. The first picture (from left) shows the original modo render. The second picture shows how well the plugin emulates modo Directional Light if the offset value is big enough - the cost of it is the enormous emission power value. On the third picture the offset value is smaller which means lower emission power, but the conversion is still OK. The fourth picture is an example for what happens if the distance is too low. The light effect feels very local (rays are not parallel).



Original modo render

Maxwell: **Light Source Offset:** 150 Km**Light Source Offset:** 100 m**Light Source Offset:** 10 m

Plugin can simulate the **Spread Angle** value of the modo Directional Light items. On the following pictures you can see some samples.



Spread angle 0°: modo

Spread angle 0°: Maxwell

Spread angle 30°: modo

Spread angle 30°: Maxwell

Spot Light

Plugin exports **Spot Light** items as a combination of an emitter sphere object and a cone geometry with reflective material. It is a very simple lamp model, but it simulates modo Spot Light items very well.

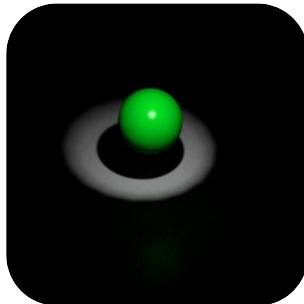
The exporter takes care of the **Cone Angle** and **Soft Edge** parameters of the Spot Light Item.

Cone Angle 30°,Soft Edge 0°

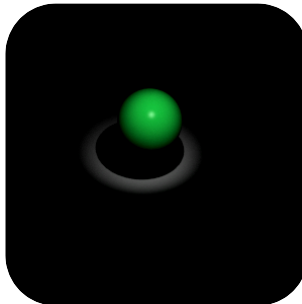
Cone Angle 30°,Soft Edge 10°



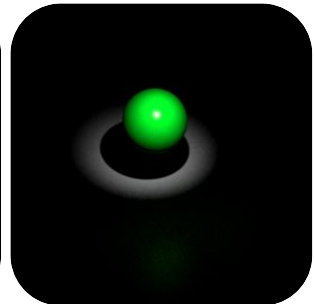
modo



Maxwell



modo



Maxwell

Cone Angle 50°,Soft Edge 0°

Segment 8

Segment 64



modo



Maxwell



There is a special Spot Light parameter: **Segments**. This parameter sets the number of the polygon sides of the lamp geometry. If Segments value is too low, the side of the light circle will be squarish.

Tip It is better to keep this value low, otherwise it will cost in render time.

Other light types

Photometric Light export is very straightforward. Maxwell Render V2 can use IES and Eulumdat files, so the plugin simply passes the IES or Eulumdat file to the emitter material file. The exporter creates a small sphere object and assigns the previously created emitter material to it.

Point Lights are exported as small sphere geometries with emitter material.

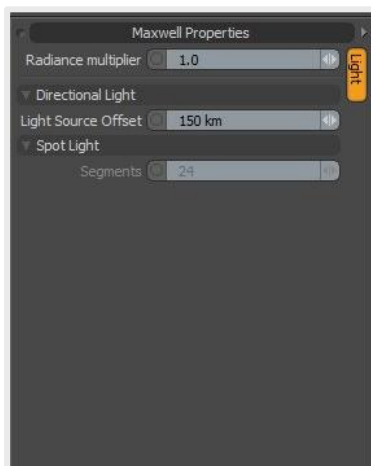
Dome Lights are exported as huge sphere geometries with emitter material.

Cylinder Lights are exported as cylindrical geometries with emitter material.

Area Lights are exported as rectangular or elliptical geometries (it depends on the Area Light Shape control) with emitter material.

Tip you can overwrite the automatically converted Light Material with an "*.mxm" file the same way as you can overwrite item materials (see sub-chapter [Maxwell MXM item](#)).

Light Properties



Radiance multiplier radiance intensity multiplier for the exported Maxwell light. The exporter tries to export the lamp emission material with the right radiance value, but you can further tweak it with this parameter.

Light Source Offset (for Directional Light items) this parameter controls how far the light source is in reality from the virtual light model. If you want to simulate the effect of a virtual sun object, the light should be really far from your scene center. The default (and recommended) distance is 150 km.

Note In case physical Sun parameter is turned on, this parameter has no effect, because light will be exported as Maxwell Sun Light.

Segments (for Spot Light items) set the polygon number of the virtual light object. More polygons = better quality, but it can dramatically increase the render time!

Note It is good to keep the segment number of the spot light object low because it can greatly affect the render speed. Be careful! If you set it too low, it will have negative effect on the rendered image quality.

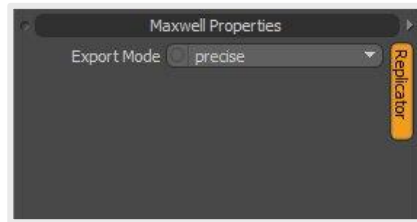
Instances, Replicators

Instance

Modo Instance Mesh items are converted into Maxwell instance objects.

Note The instance item uses the material(s) of the source item, even if it has different material in modo!

Replicator



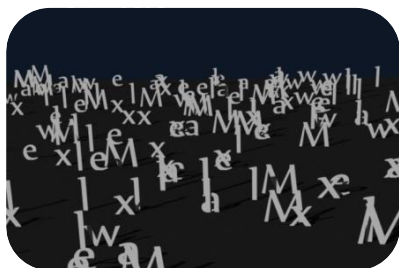
During the export process plugin converts the elements of the replicator item to Maxwell instances.

Export Mode you can choose from two export mode.

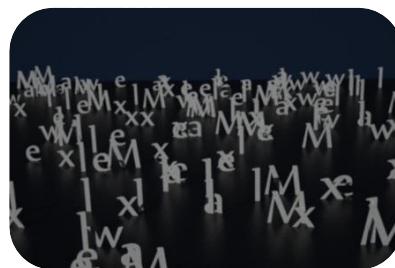
In **precise** mode the plugin converts the replicator with the help of the modo Replicator freeze option. The created instance objects follow the randomization, rotation, scale defined in the modo replicator item, and you can use all kind of replicator point sources available in modo (Mesh item, Surface Generator, 3rd party particle items, etc.). Modo Replicator freeze option can be very slow! If you are working with huge number of particles it can be better to choose fast export mode.

In **fast** mode plugin uses its own function to convert the replicator item to Maxwell instances. It is much faster than **precise** mode, but the randomization of the resulted items doesn't match exactly the original modo Replicator. (This mode can handle Mesh or Surface Generator point sources but not the 3rd party particle items.)

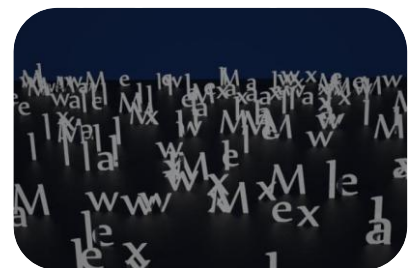
Note Replicator export can take a long time.



modo



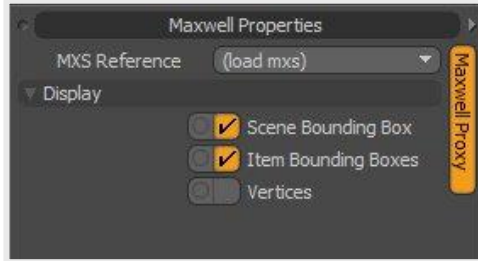
Maxwell



Maxwell – fast mode

Maxwell Proxy

With Maxwell Proxy item you can integrate Maxwell Proxy objects into the modo scene. It means you can merge whole Maxwell scenes into your modo scene without slowing down your viewport.



MXS Reference the attached mxs file.

Scene Bounding Box show/hide the Bounding Box of the referenced scene.

Item Bounding Boxes show/hide the object Bounding Boxes of the referenced mxs scene.

Vertices show/hide the object vertices of the referenced mxs scene.

Note You can use Maxwell Proxy item as a modo Replicator prototype.

Summary of exported parameters

This list is not full!

Coordinate System

- Y-up system supported
- Z-up system supported

Item

- Position, Rotation, Scale (exported in World Space - no Hierarchies – it is only important in Maxwell Studio)
- Visibility

Mesh

- Polygons, Texts, Spline Patches, Subdivs
- Vertex/Polygon Normals
- multiple UV maps

• Mesh

Mesh Instance (Materials and shaders are the same as the Source Mesh materials and shaders)

Camera

- Focal Length
- Film Width
- Film Height
- Film Offset X
- Film Offset Y
- Film Fit
- Focus Distance
- F-Stop

• Camera

Light

- Point Light
 - Radiant Intensity
- Directional Light
 - Radiant Existance
 - Physical Sun (If Physical Sun parameter is on it provide sun position to Maxwell physical sky.)
 - Spread Angle
 - Directional Light
- Spot Light
 - Cone Angle
 - Radiant Intensity
 - Soft Edge
 - Spot Light
- Photometric Light
 - IES files
- Supported Layer parameters
 - Enable
 - Opacity
 - Invert
- Supported Material Items
 - Light Material (Only Light Color)
 - Constant (Only color)

Texture Locator

- Projection modes (Planar, Cubical, Box, Cylindrical, Spherical, Front, Solid, UV Map) – On Image Maps Solid projection has the same effect as Cubic projection. Plug-in exports Solid projection as Cubic projection.

Replicator

- Prototype (can be group – with variability, mesh item, or replicator)
- Point Source
- Source Mode (Point Data, Align to Surface)
- Include Child Items

- Render Density
- Seed
- Random Offset, Random Twist , Random Scale with or without uniform scale (effect is similar, but randomization is not equivalent with the modo randomization)

Environment

- Intensity (has affect only if **Environment Type** is not Physical Sky)
- Visible To Camera, Visible To Indirect Rays, Visible To Reflection Rays, Visible To Refraction Rays (If all of these four visibility flags are set to false, then the exported Maxwell Environment will be set to none. Otherwise these parameters can turn on and off ImageBased Environmet image maps (**Visible To Camera**->Background, **Visible To Indirect Rays**->illumination, **Visible To Reflection Rays**->Reflection, **Visible To Refraction Rays**->Refraction)
- **Supported Layer parameters**
 - Enable
 - Opacity
 - Invert
- **Supported Material Items**
 - Environment Material
 - Environment Type (**Constant**, **2 Color Gradient**, **4 Color Gradient**, **CIE Overcast Sky** are all Dome Light in Maxwell with the **Zenith Color**)
 - Sun Light (If there is or there are **Directional Lights** in the Scene with **Physical Sun** option turned on, the last one will be the environment Sun)
 - **Maxwell Environment**
 - Constant (Only color)
 - Image Map (Only **hdr** and **exr** formats!)
 - Projection Type (If UVMa**p Projection Type** is set to Spherical, then it exports the ImageBased environment to Maxwell with Spherical mapping, otherwise it sets the ImageBased environment to Screen Mapped. Projection Axis has to be the same as modo Up Axis, and only rotation around this axis is exported)
 - Horizontal Wrap (Only in Spherical **Projection Type**)
 - Vertical Wrap (Only in Spherical **Projection Type**)

Render

- Render Camera
- Frame Width
- Frame Height
- Pixel Aspect Ratio
- Render Region
- **Supported Layer parameters**
 - Enable
 - Opacity
 - Invert
- **Supported Layer effects**
 - Diffuse Color
 - Bump
 - Luminous Color
 - Luminous Amount
- **Supported Material Items**
 - Default Shader (Shader parameters can only work on item level in Maxwell)
 - Visible To Camera (If any part of the mesh item is visible, than the whole item is visible)
 - Visible To Indirect Rays (If any part of the mesh item is visible, than the whole item is visible)
 - Visible To Reflection Rays (If any part of the mesh item is visible, than the whole item is visible. **Visible to Reflection** and **Visible to Refraction** options are handled together, if one of them is set to false than both of them are false in Maxwell)
 - Visible To Refraction Rays (If any part of the mesh item is visible, than the whole item is visible. **Visible to Reflection** and **Visible to Refraction** options are handled together, if one of them is set to false than both of them are false in Maxwell)
 - Group Mask
 - Item filter
 - Polygon Tag filter (Material, Part and Group – Mask by Selection Sets are not supported)
 - Advanced Material
 - Diffuse Color
 - Diffuse Amount

- Specular Color
- Specular Amount
- Roughness
- Anisotropy
- Reflection Color
- Reflection Amount
- Transparent Color
- Transparent Amount
- Bump Strength
- Displacement
- Luminous Intensity
- Luminous Color
- Constant Material
 - Color
- Image Map
 - Projection Type (Planar, Cubical, Box, Cylindrical, Spherical, Front, UV Map)
 - Horizontal Wrap
 - Vertical Wrap
 - Horizontal Repeat (Maxwell has no **Mirror** and no **Edge** mode. **Mirror** mode is replaced with **Repeat** mode during the export and **Edge** mode has the same result as the **Reset** mode in Maxwell.)
 - Vertical Repeat (Maxwell has no **Mirror** and no **Edge** mode. **Mirror** mode is replaced with **Repeat** mode during the export and **Edge** mode has the same result as the **Reset** mode in Maxwell.)
 - Texture Filtering (**Bicubic** and **Bilinear** = filter on in Maxwell, **Nearest** = filter off in Maxwell)

Limitations

- Old scenes (started in earlier version of modo - before 302) can make modo crash during the export! It also can happen that the export process runs fine, but the exported parameters are not correct. For example instanced items are not exported well, sun position is wrong, etc. - Please start a new scene in modo and copy your old items into the newly created scene. This can solve the problem.
- Light Probe and Implicit UV projection modes are not supported.
- Plugin can't export procedural textures with Solid projection type
- Plugin can't blend Image Maps together, only the top image is exported.
- Modo fur is not supported.
- Plugin can't export channels with linked sources. If you want the plug-in to use the real values of the linked channels, please bake out those channels.

FAQ

- **[Is there an option to reset the layout of the plugin window? I have accidentally changed it, and I don't know how to change it back]** Plugin has no option to reset its UI but you can easily do it manually. *Please read sub-chapter [Customize plugin UI](#).*

Acknowledgements

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