Light rays 101

<http://cgnotebook.com/wiki/Mental_ray_volumetric_shadows_with_parti_volume_in_Maya>

<http://cgnotebook.com/wiki/Mental_ray_for_Maya_parti_volume>

<http://forums.cgsociety.org/showthread.php?t=812857>

<http://forums.cgsociety.org/showthread.php?f=87&t=819636>

<http://www.muttsy.net/blog/2010/01/15/parti_volume-setup/>

## parti\_volume volumetric shadows in mental ray for Maya

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Crepuscular rays at sunset

This tutorial explains how to create [volumetric shadows](http://cgnotebook.com/w/index.php?title=Volumetric_Shadow&action=edit&redlink=1) in haze or fog using the [parti\_volume](http://cgnotebook.com/wiki/Mental_ray_for_Maya_parti_volume) [mental ray render node](http://cgnotebook.com/wiki/Mental_ray_for_Maya_Render_Nodes). Of course, it'll only render in [mental ray](http://cgnotebook.com/wiki/Mental_ray)! This technique can be used to simulate "God-Rays", technically known as [Crepuscular Rays](http://cgnotebook.com/wiki/Crepuscular_Rays), as seen in the thumbnail on the right.

## Demonstration Scene for Download

This tutorial will go through some simple steps to set up this kind of effect using a demonstration scene. [Click Here](http://uploading.com/files/M28EF8DV/PartiVolumeShadow.zip.html) to **download the example scene** and follow along. It includes a final version of the scene so you can double-check your settings.

[An alternative approach](http://cgnotebook.com/wiki/Volumetric_Shadows_in_a_Maya_Software_Render) to this technique uses [d-map shadows](http://cgnotebook.com/w/index.php?title=Maya_D-Map_Shadows&action=edit&redlink=1) and [volume primitives](http://cgnotebook.com/w/index.php?title=Maya_Volume_Primitive&action=edit&redlink=1). - This technique usually [renders](http://cgnotebook.com/wiki/Render) faster but is less accurate and lower quality.

### 1. Add a Light and set Trace Depth attributes



Of course, the first step is to [add a light to the scene](http://cgnotebook.com/wiki/Maya_Lights#Creating_Maya_Lights), if none are present already. A [directional light](http://cgnotebook.com/wiki/Maya_Directional_Light) will work best in this instance, as it most closely represents the [Sun](http://cgnotebook.com/w/index.php?title=Sun&action=edit&redlink=1).

In the [attribute editor](http://cgnotebook.com/w/index.php?title=Maya_Atrribute_Editor&action=edit&redlink=1) for the [directional light](http://cgnotebook.com/wiki/Maya_Directional_Light) [shape](http://cgnotebook.com/wiki/Maya_Shape_Node), scroll to the [Raytrace Shadow Attributes](http://cgnotebook.com/wiki/Maya_Lights#Raytrace_Shadow_Attributes). Enable [Use Ray Trace Shadows](http://cgnotebook.com/wiki/Maya_Lights#Use_Ray_Trace_Shadows) and set the [Ray Depth Limit](http://cgnotebook.com/wiki/Maya_Lights#Ray_Depth_Limit) to at least 5.

[Enable the mental ray plugin](http://cgnotebook.com/wiki/Mental_ray#Enabling_the_Plugin), if it isn't already running. From your [render settings](http://cgnotebook.com/wiki/Maya_Render_Settings), make sure mental ray is set to be the current [renderer](http://cgnotebook.com/w/index.php?title=Render_Engine&action=edit&redlink=1), by [selecting it from the "Render Using"](http://cgnotebook.com/wiki/Maya_Render_Settings#Render_Using) [combo-box](http://cgnotebook.com/w/index.php?title=Combo_Box&action=edit&redlink=1) at the top of the [render settings window](http://cgnotebook.com/wiki/Maya_Render_Settings).

Under the [Quality tab](http://cgnotebook.com/wiki/Mental_ray_for_Maya_Render_Settings#Quality_Tab), make sure [raytracing is turned on](http://cgnotebook.com/wiki/Mental_ray_for_Maya_Render_Settings#Raytracing_Toggle), and that the [shadow trace depth](http://cgnotebook.com/wiki/Mental_ray_for_Maya_Render_Settings#Shadows) is at least 5. If it's any less, the shadows won't trace deep enough through the volume and therefore won't render.

### 2. Enable Auto Volume



In the [render settings window](http://cgnotebook.com/wiki/Maya_Render_Settings), switch the to [features tab](http://cgnotebook.com/wiki/Mental_ray_for_Maya_Render_Settings#Features_Tab), under [extra features](http://cgnotebook.com/wiki/Mental_ray_for_Maya_Render_Settings#Extra_Features), [enable auto volume](http://cgnotebook.com/wiki/Mental_ray_for_Maya_Render_Settings#Auto-Volume), and set the [volume samples](http://cgnotebook.com/wiki/Mental_ray_for_Maya_Render_Settings#Volume_Samples) to 10, to begin with.

### 3. Fit a Polygon Primitive around your scene



[Create a new Polygon Primitive](http://cgnotebook.com/wiki/Maya_Polygon_Primitive#Creating-New-Primitives) and fit it around your scene, or wherever it is that you need the fog or haze to appear.

### 4. Make a new Lambert Material and MR nodes



[Make a new Lambert Material](http://cgnotebook.com/wiki/Maya_Hypershade#Creating_New_Materials) and [assign it](http://cgnotebook.com/wiki/Maya_Hypershade#Assigning_Materials_to_Surfaces) to your [polygon primitive](http://cgnotebook.com/wiki/Maya_Polygon_Primitive).

With the new [Lambert](http://cgnotebook.com/wiki/Maya_Lambert) created, [graph its input and output connections](http://cgnotebook.com/wiki/Maya_Hypershade#Input_and_Output_Connections) in the [work area](http://cgnotebook.com/wiki/Maya_Hypershade#Work_Area). [Switch the set of render nodes](http://cgnotebook.com/wiki/Maya_Hypershade#Switching_Render_Node_Sets) to [Create mental ray Nodes](http://cgnotebook.com/wiki/Mental_ray_for_Maya_Render_Nodes).

From [Materials](http://cgnotebook.com/wiki/Mental_ray_for_Maya_Render_Nodes#Materials), middle-mouse button drag a [transmat](http://cgnotebook.com/wiki/Mental_ray_for_Maya_transmat) over next to the new [Lambert](http://cgnotebook.com/wiki/Maya_Lambert) in the [work area](http://cgnotebook.com/wiki/Maya_Hypershade#Work_Area).

From [Volumetric Materials](http://cgnotebook.com/wiki/Mental_ray_for_Maya_Render_Nodes#Volumetric_Materials), middle-mouse button drag in a [parti\_volume](http://cgnotebook.com/wiki/Mental_ray_for_Maya_parti_volume) too.

### 5. Connect up the Shader Network



Select the [Shading Group](http://cgnotebook.com/wiki/Maya_Shading_Group) for the new [Lambert](http://cgnotebook.com/wiki/Maya_Lambert) in the [work area](http://cgnotebook.com/wiki/Maya_Hypershade#Work_Area) and press control+a to open the [Attribute Editor](http://cgnotebook.com/wiki/Maya_Attribute_Editor). Arrange your windows so you can see both your [work area](http://cgnotebook.com/wiki/Maya_Hypershade#Work_Area) with your new Render Nodes and the [Attribute Editor](http://cgnotebook.com/wiki/Maya_Attribute_Editor) at the same time.

Make sure you're on the tab for the shading group (*lambertxxSG*) in the [Attribute Editor](http://cgnotebook.com/wiki/Maya_Attribute_Editor) and open up the menu sets for [mental ray](http://cgnotebook.com/wiki/Maya_Shading_Group#mental_ray) and then [Custom Shaders](http://cgnotebook.com/wiki/Maya_Shading_Group#Custom_Shaders).

Middle mouse button drag your [transmat](http://cgnotebook.com/wiki/Mental_ray_for_Maya_transmat) from the [Hypershade work area](http://cgnotebook.com/wiki/Maya_Hypershade#Work_Area) into the channel slots for both [Material Shader](http://cgnotebook.com/wiki/Maya_Shading_Group#Material_Shader) and [Shadow Shader](http://cgnotebook.com/wiki/Maya_Shading_Group#Shadow_Shader) in the [Custom Shaders](http://cgnotebook.com/wiki/Maya_Shading_Group#Custom_Shaders) section in the [Attribute Editor](http://cgnotebook.com/wiki/Maya_Attribute_Editor).

Now middle mouse button drag your [parti\_volume](http://cgnotebook.com/wiki/Mental_ray_for_Maya_parti_volume) from the [Hypershade work area](http://cgnotebook.com/wiki/Maya_Hypershade#Work_Area) into the channel slot for the [Volume Shader](http://cgnotebook.com/wiki/Maya_Shading_Group#Volume_Shader).

The transmat is responsible for making the surface of your stand-in primitive transparent, and to stop the surface itself from casting shadows. If you simply suppress the maya shaders instead, Maya will ignore the whole object when it goes to render it - so make sure you *don't* check that flag. The parti\_volume is responsible for creating the atmospheric effect inside the primitive.

### 6. Connect the Lights to the parti\_volume



Select the [parti\_volume](http://cgnotebook.com/wiki/Mental_ray_for_Maya_parti_volume) node in the [Hypershade work area](http://cgnotebook.com/wiki/Maya_Hypershade#Work_Area) to bring up its attributes in the [Attribute Editor](http://cgnotebook.com/wiki/Maya_Attribute_Editor).

Now in the [Attribute Editor](http://cgnotebook.com/wiki/Maya_Attribute_Editor), open up the [Light Linking](http://cgnotebook.com/wiki/Mental_ray_for_Maya_parti_volume#Light_Linking) menu set, then [Lights](http://cgnotebook.com/wiki/Mental_ray_for_Maya_parti_volume#Lights). Leaving the [lights[0]](http://cgnotebook.com/wiki/Mental_ray_for_Maya_parti_volume#Lights.5B0.5D) channel slot visible, switch to the [Lights Tab](http://cgnotebook.com/wiki/Maya_Hypershade#Lights_Tab) in the [Hypershade window](http://cgnotebook.com/wiki/Maya_Hypershade).

In the same fashion as the previous step, middle mouse button drag your Light icon from the [Lights Tab](http://cgnotebook.com/wiki/Maya_Hypershade#Lights_Tab) into the [lights[0]](http://cgnotebook.com/wiki/Mental_ray_for_Maya_parti_volume#Lights.5B0.5D) channel slot in the [Attribute Editor](http://cgnotebook.com/wiki/Maya_Attribute_Editor). If you need to connect more lights, refresh the [Attribute Editor](http://cgnotebook.com/wiki/Maya_Attribute_Editor) and another slot will appear.

The setup will work without explicitly connecting your lights to the [parti\_volume](http://cgnotebook.com/wiki/Mental_ray_for_Maya_parti_volume), but it's better to be sure...

**Step 6.5, this won’t work without this ->**

You may now notice that you are getting delicious light fog but that the objects in your Container are not casting shadows into the volume. You can turn on shadows in the light, but it won’t work. The last step is to go back into HyperShade and under Create Mental Ray Node > MentalRay Lights, create a mib\_light\_spot *(or mib\_light\_infinte if you are using a directional, I think…).* Now select your original Spotlight *(whatever light you are using)* and open up its Mental Ray section and than navigate to the Custom Shaders section. Middle mouse drag the mib\_light\_spot into the Spotlights Light Shader slot. Your Spotlight *(light)* should look like this.



### 7. Tweak the Shading Network

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The final step is to tweak the [parti\_volume](http://cgnotebook.com/wiki/Mental_ray_for_Maya_parti_volume) node to make the volume material actually respond to light. At the very least, turn up the [Scatter](http://cgnotebook.com/wiki/Mental_ray_for_Maya_parti_volume#Scatter) attribute. For more information on tweaking the parti\_volume node, [click here](http://cgnotebook.com/wiki/Mental_ray_for_Maya_parti_volume).

**If it’s not working still, check these things:**

Do you have "Auto Volume" checked, in your Render Settings?

Did you link your light to the parti\_volume?

Did you create a physical light shader?