

# Vue Scene Lighting Example

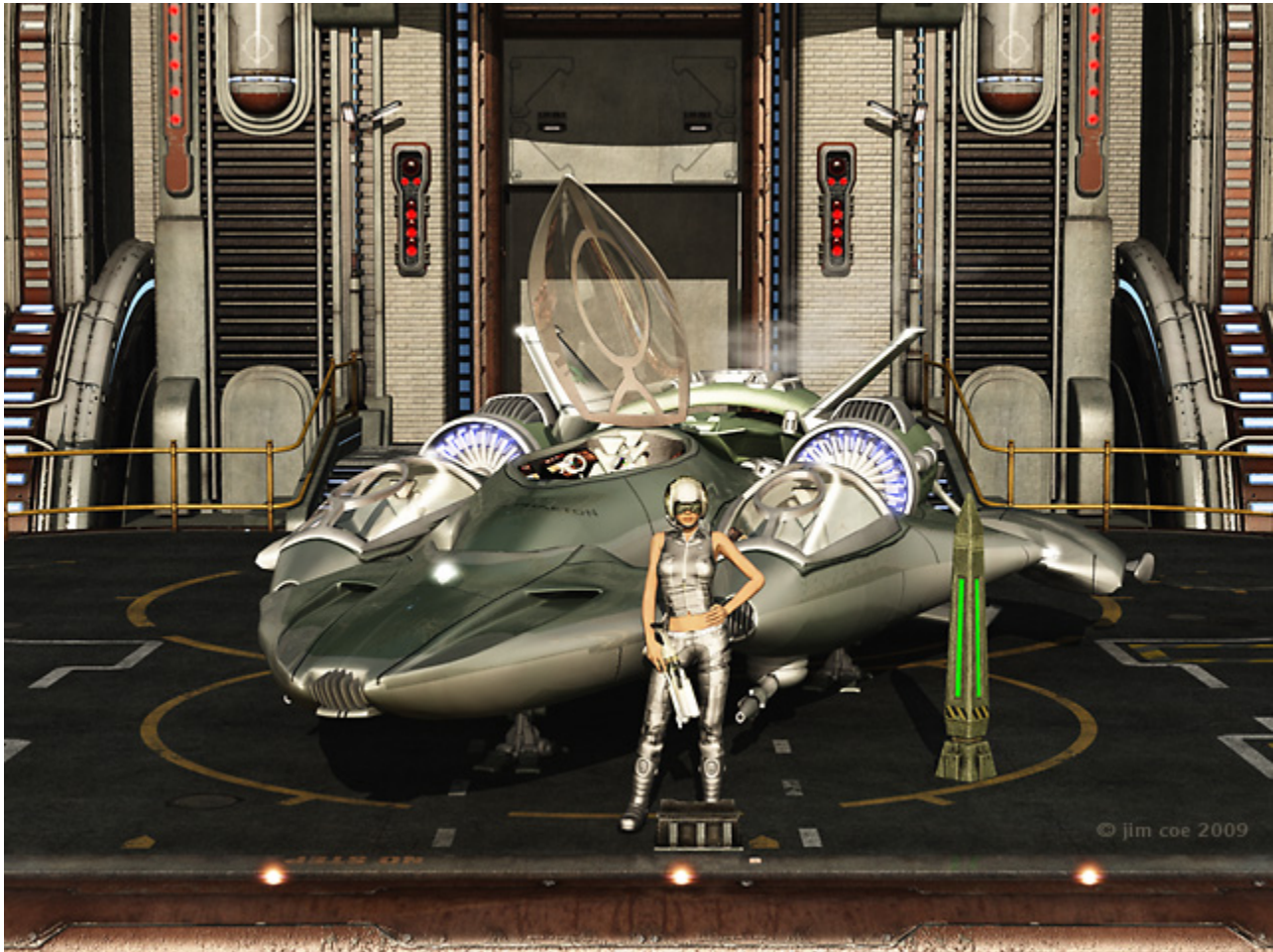
Jim coe '[Art Head Start](#)' Revision 1.0

Lighting schemes involve personal taste and strong opinions. You'll encounter plenty of mine here, but please remember my rule of no rules. Let your image itself tell you what it wants. Don't force on it the rules and opinions of others.

We start with a rather complex 3D scene. It's lit like the Vue 3D default. That is, with a Spectral atmosphere and 2 light sources - the sun and the skydome. I set the sun azimuth to 180° and pitch to 23°. The lighting model is radiosity.

Let's see if we can add drama and meaning by changing only the lighting. Can we make it more appealing, tell more of a story, give a stronger feeling of time and place?

**Here's our starting scene. What could be improved?**



What to improve? What to avoid?

- The default sunlight is rather flat and uninteresting. The image lacks depth.
- The lighting doesn't bring out the 3D aspect of the forms as much as it could.
- Default lighting and the model's materials give a limited color scheme.
- There are few shadows and default shadows are too sharp edged.
- The ship and building both demand equal visual attention. Separation is needed.
- What is the center-of-interest? With added emphasis we make sure it's the figure.
- Light sources in the models (e.g. flood lights on poles) are not expressed.
- The vapor cloud at the rear of the ship is not very visible.
- We must avoid confusing multiple shadows when adding light sources.
- We should avoid lighting without a reasonable source – no confusing "off-stage actors".

## Here we go – Step One

A good way to emphasize lighting, when artificial light sources are involved, is to change to a night view. We'll use an "early sunrise" look. In this way we can add dramatic sunrise colors, use fancy artificial light sources and show off some of the lights built into the models. As many of you know, I'm a color fiend, and I'll use bright colors here. Even so, real world light sources have more color than most people realize or make use of.

Let's start by turning off the sun light source. We'll add an orange-red omni (point light) rim light from near the camera, as a dawn sun. It will hit our scene from the front and from just above the horizon.

My custom light filter will prevent light from this source from penetrating too far into the scene or reflecting too strongly from the outermost wing section. More on this later.

An overhead fill light will represent the skydome. For more color contrast with our new orange-red rising sun, let's make that overhead fill a blue-violet sky color. This will show off the ship's skin and help separate it from the background. For lighting consistency we'll also illuminate the building model with this same overhead fill light.

### First step – dawn sun and sky



OK, the above first step seems like a good start. It's a lot more colorful and those colors help bring out the 3D contours and scene depth. The dark background is less confusing now and the ship and figure are separating better. The well-known depth effect of warm colors advancing and cool colors receding also helps with the depth illusion.

## **What problems, challenges and opportunities do we see now?**

As we add more light sources, we'll have to be on the lookout for multiple shadows. We want to create a convincing artwork, not re-create reality. Just because multiple shadows would happen in the real world doesn't mean we want them confusing the viewer in our image. We may want multiple shadows sometimes, other times not. We strive for photo-realism - but let's not use it thoughtlessly.

## **Every light source and lighted material should tell a story**

Strong personal opinion time. As our lighting scheme develops, some of the things I'll do are driven by a concept which is important to me...

Every area of light reflected from a scene's materials tells a story. It's more than a narrative about the nature of the materials reflecting light to our eyes. Naturally our materials must be well-crafted and properly scaled for good lighting. But the story our lighting tells the viewer should also reveal the light sources - even the "implied sources", the ones we can't see inside our frame.

Imagine a scene with a dinner table illuminated by candle light, and also by the Moon shining through a window. Where does that yellow-orange light come from? Obviously from the candles, and the candle flames are there to prove it. Therefore the viewer is able to "see what they believe". We should never ask them to "believe what they see" - people simply can't do that well. Human brains are pattern recognition engines, not logic engines.

But what about the Moon? If the Moon isn't visible in the image, we have an image telling a story with part of the plot missing. Our moonlight source is an unseen actor speaking their part from off-stage. It's "Pay no attention to that man behind the curtain" time.

We must make our moonlight very obviously from the Moon. Our moonlight must be credible or our scene becomes incredible. We must be sure that people do "Pay no attention to that man behind the curtain". In short - they must not be bothered by this light from an unseen source. If we fail, viewers will likely sense something wrong.

The lesson is to show your light sources when you can and be very careful to make their effects believable when you can't.

## **Back to work - Step Two**

It would be good to make our center-of-interest figure stand out more. There are a couple of practical ways to do that. She's standing in front of a recessed runway floodlight, which is part of the building model. We can cast light onto some parts of her from there. And that Obelisk prop has lights in it. The Obelisk light gives us a credible excuse for a rim light on the edge of her figure - which is why I sneaked it in there. Here's an opportunity to add an accent color to our color scheme and a rim light to emphasize our image's center of interest - at one stroke!

What's an accent color? Just as a good meal uses a bit of spice to add taste perspective, a good color scheme needs just a little bit of a complimentary (opposite) color to calibrate the mind's eye.

Our color scheme is big on blue-violets and red-oranges, so a brilliant green is a good compliment.

## Step 2 – Four green spotlights for the Obelisk give a rim light and accent color



But we have to be careful that the Obelisk doesn't become more visually important than the figure. It did so when I tried to add lens flares to the Obelisk. That goes for all light effects. It's easy to get carried away with fun lighting effects and accidentally upstage your main objects, to the detriment of your composition.

### **Adding lights to our models**

In step 3, let's add spotlights to the 4 pole-mounted floodlights near the back wall. The two facing across the scene would look good as volumetric lights, since the camera is not inside their light beams. For that same reason the lens flare effect won't be used for them – it wouldn't do much.

The two floodlights facing us will become big, very bright flares of light if we make them volumetric, because the camera is inside their light cone (beam). Those two would look good with a lens flare effect though. But we need to keep lens flares subtle, so as not to attract the eye too much.

The remaining building lights will be left as they are, just glowing materials without actual light sources.

Notice in the resulting image below that our new flood lights are not set to illuminate the ship or vapor cloud.

### Step 3 – Add 4 spotlights (2 volumetric, 2 flares) for the pole-mounted flood lights



Our pole-mounted flood lights look good. The trick with them is to make them bright enough to be believable, but not so bright that they pull the eye too much or light the back wall so brightly that the ship loses too much visual separation from the building.

### Step 4

Now for step 4, we'll add more incidental light sources. For added drama and better visual communication about the ship model's details, let's add a red light inside each of the 3 cockpits.

Red is a credible color because many people understand that it's used in environments where people's eyes need to be dark-adapted. Red will add a "triad" to our color scheme and also help integrate the ship into the scene, since the building already has red lights.

We also want to gain control of the look of the vapor cloud. So we'll add a fill light just for it.

#### Step 4 - Incidental lights for the cockpits and to illuminate the vapor cloud



The left and right cockpit omni (point) lights were easy to add, but a point light didn't work well for the center cockpit. Too much red light was cast onto the open canopy structure and not enough inside the center cockpit, even when using a quadratic omni source.

Using a spotlight from above, projected down into the center cockpit, was a better choice. However, for some reason having to do with the ship model, the red spotlight also illuminated the left landing gear! I used another custom light filter to cut off the red light's beam just below the cockpit to fix that problem. The red cockpit lights are set to only illuminate the ship.

I tried yellow and orange colored lights to illuminate the white volumetric vapor cloud material, but ended up using white. The idea is that, in the real world, the flood lights would illuminate it more than does the orange-yellow rising sun.

#### Step 5

In our last step, we'll add the light sources representing the flight deck's partially recessed footlight, just in front of our figure.

We want it to add white light to the figure, to help her stand out as the center-of-interest of our image. It should also bring out the detail of the structures on the bottom of the ship and cast shadows on the real wall. While we're at it, we'll add omni fill lights for the figure and sky deck, to fine tune them.

## Step 5 - Finally, the difficult footlight setup and 2 fill lights



The footlight work turned out to be very challenging for several reasons!

1. She's standing so close to the footlight that she blocks almost all the light from reaching the back wall. And there are good reasons not to move her.
2. A single spotlight, placed at the footlight, is much too bright on the ship's underside, if its bright enough to show on the rear wall.
3. Three light sources were reflecting from the wing structure with a very bright glare.



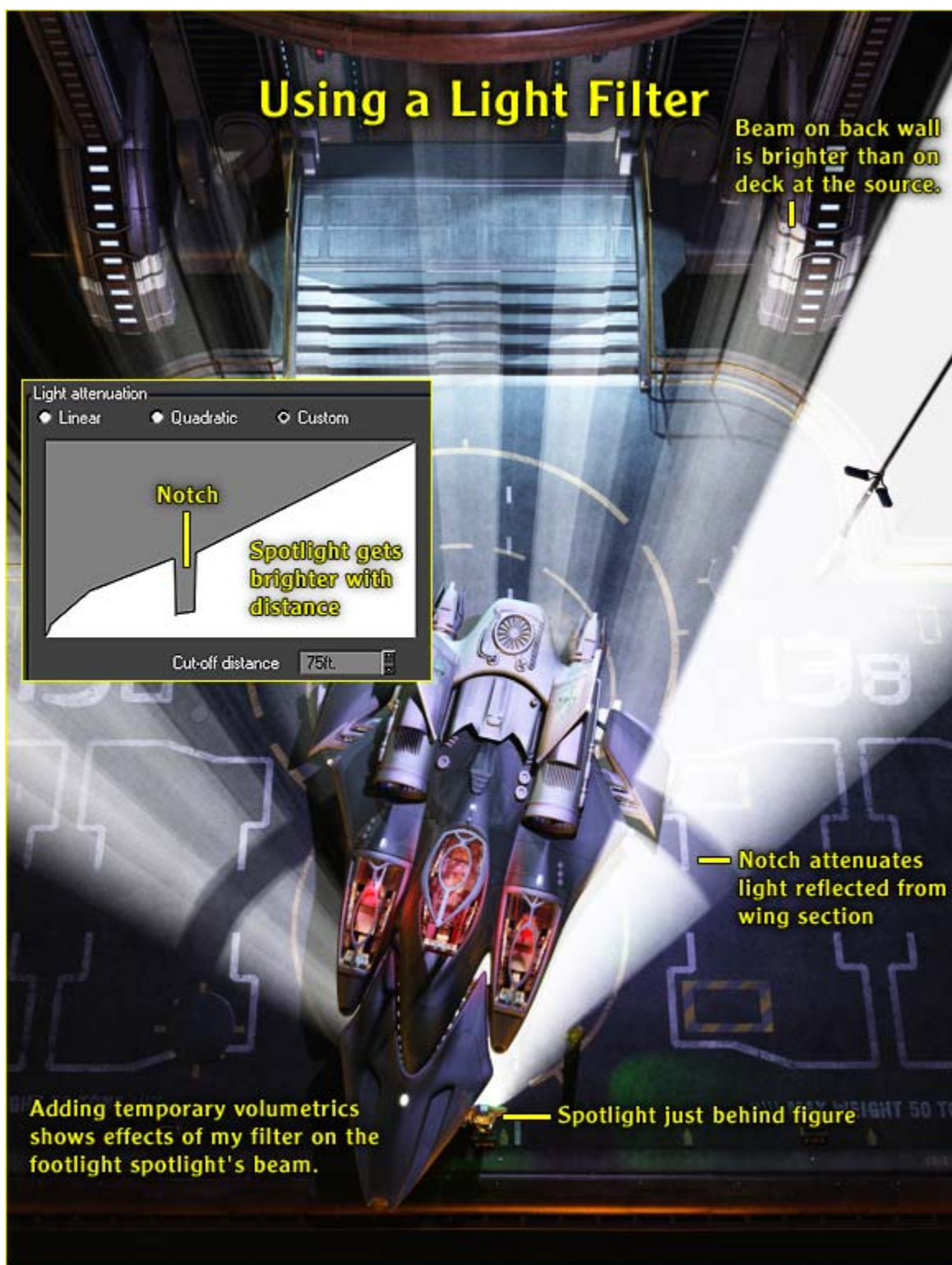
The ship's wings have this extended tip section. The surfaces marked "Problem area" reflect brightly into the camera for the green Obelisk light, rising sun light and footlight. They're so bright that the image composition is upset. What to do?

## Light beam filters

Remembering the powerful light filter feature in Vue Infinite's Light and Shadow editor, I made a filter with a "notch" in it at just the distance of that problem area.

One such filter knocks down the light level for the footlight's "back wall spotlight". Another similar filter does the same for the rising sun light source, and also cuts it off before it reaches the back wall, which was too bright when illuminated by that source, at the intensity needed for the front edge of the deck.

Included in the footlight's "back wall spotlight" filter is a backwards nonlinear intensity curve, to make the light on the back wall brighter, without affecting the intensity of the light on the deck just in front of the footlight. A top view shows that filter and its effects.



What about the other 2 problems?

1. She's standing so close to the footlight that she blocks almost all the light from reaching the back wall.
2. A single spotlight, placed at the footlight, is much too bright on the ship's underside, if bright enough to show on the rear wall.

To solve the first problem, I cheated the footlight's back wall spotlight to a position between and a bit behind her shins. Unhappily that means her shadow is missing from the deck surface. "Cheating" a light source means to place an invisible light source some distance away from where the viewer thinks it is, to improve the lighting in some way.

I had to introduce yet another spotlight to correctly illuminate the ship underside. It also helps light the deck. Then I added an omni light source at the footlight just for the figure.

The footlight, which looks to the viewer like just one light source actually contains three sources! The unsolved problem is that none of the 3 casts a good shadow for the figure. Although I didn't attempt it, a fix could be adding yet another spotlight - or getting even trickier with light beam filters.

### Results of final lighting scheme

On the next page, we have room enough to compare our "Before" and "Final" images.

Before – 1 light source



Final Lighting Scheme – 20 light sources



## Light Sources List

#	Use	Type	Color	Notes
1	Dawn sun	Linear Omni	Orange-yellow	Ship, figure, sky deck: filter
2	Sun & skydome	Distant Light	Blue-violet	All except vapor cloud
3	Ship top fill	Linear Omni	Blue-violet	Only ship
4	Footlight & ship bottom	Linear Spot	White	Only ship, sky deck
5	Footlight & figure's legs	Linear Omni	White	Only figure
6	Footlight & back wall	Linear Spot	White	Only sky deck: filter
7	Figure front fill	Linear Omni	White	Only figure
8	Vapor cloud fill	Linear Omni	Light Yellow	Only vapor cloud
9	Sky Deck Fill	Linear Omni	Orange-yellow	Only sky deck
10	Left pole light A	Linear Spot	Light Blue	Only sky deck: lens flare
11	Left pole light B	Linear Spot	Light Blue	Only sky deck: volumetric
12	Right pole light A	Linear Spot	Light Blue	Only sky deck: lens flare
13	Right pole light B	Linear Spot	Light Blue	Only sky deck: volumetric
14	Left cockpit	Linear Omni	Red	Only ship
15	Middle cockpit	Linear Omni	Red	Only ship: filter
16	Right cockpit	Linear Omni	Red	Only ship
17	Obelisk figure rim	Linear Spot	Green	Only figure
18	Obelisk north	Linear Spot	Green	Only sky deck: filter
19	Obelisk east	Linear Spot	Green	Only ship
20	Obelisk west	Linear Spot	Green	Only sky deck

### ~ Credits ~

This scene uses an excellent Sci-Fi 3D building model called "Sky Deck", by the much admired 3D artist "[Stonemason](#)" (Stefan Morrell). The scene has 2 other main models, plus a prop and a special effect. Those models are the wonderful "[Phaeton Starship](#)" by "Winnston1984", and [DAZ 3D's](#) "Victoria 4.2" wearing the "Future Cop" costume from DAZ, by 3D Universe.

The prop is Stefan's "Obelisk" model, one of the freebies on his [site](#) (thanks Stefan!). The special effect is a cloud of vapor above the fan-like object on the back of the ship.

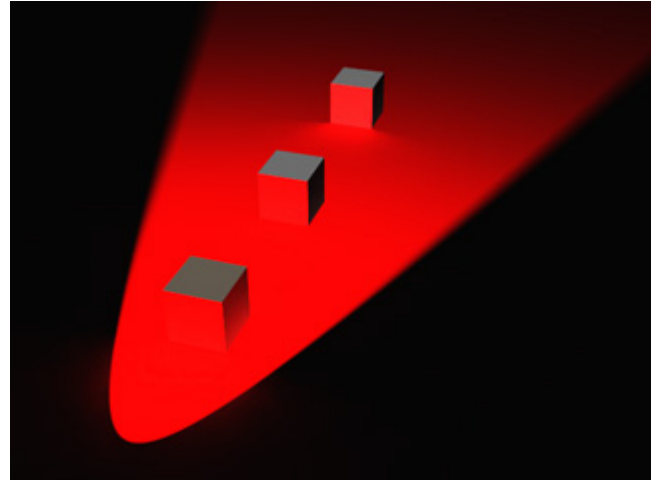
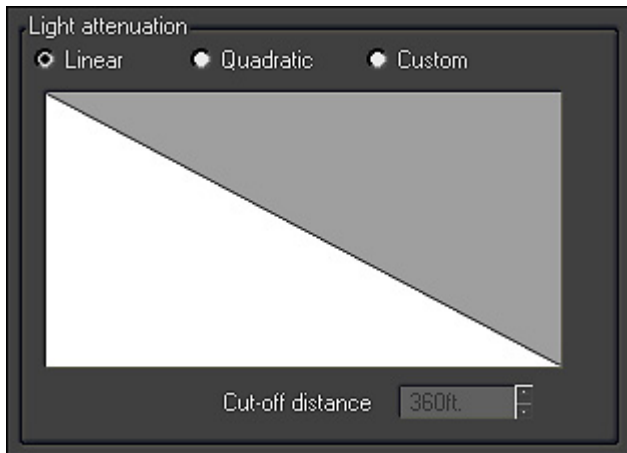
### More on light beam filters

A number of valuable effects can be had by using Vue's Light and Shadow editor filters:

- **Change to an arbitrary non-linear curve of intensity Vs distance:**
  - Reverse the curve, so distant surfaces are as bright as near ones. Since the light cone spreads to cover more area with distance, it's hard to actually make near surfaces brighter than far ones.
- **Notch (attenuate) or bump (increase) specific distance ranges in your beam:**
  - Can be smooth or abrupt, depending on the steepness of your curve.
- **Start or end a light beam (or both) at an arbitrary distance:**
  - Good for starting light beams of searchlights, headlights, flashlights, etc. at the lens or opening, with control of the beam diameter, rather than as a point.
- **Change light beam colors with distance**

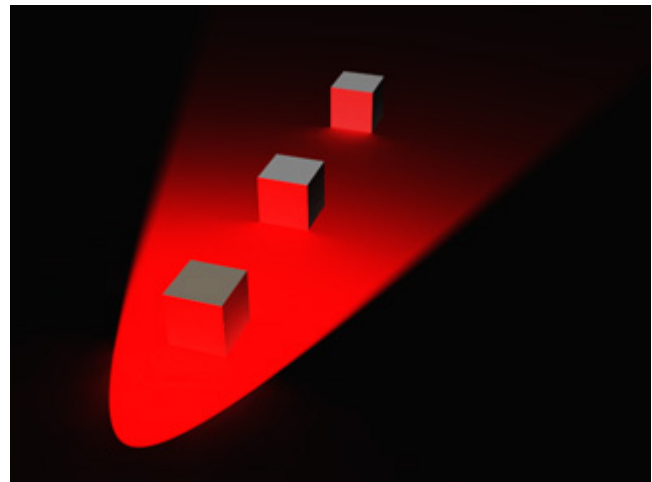
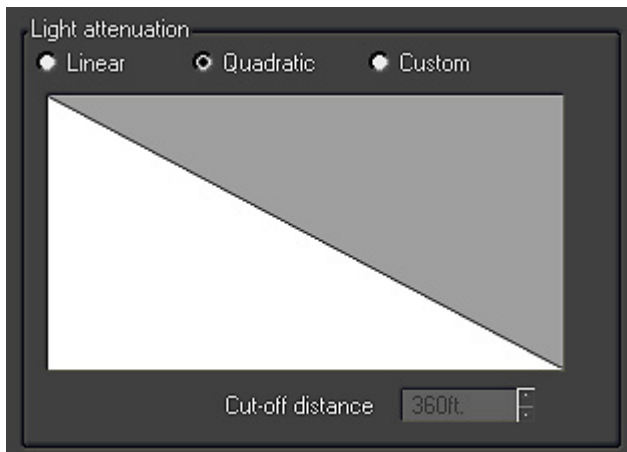
## Some light beam filter examples

### Default linear spotlight



This is the default setup for a linear (straight-line) spotlight source. Notice how gradual the light fall-off with distance is. It uses  $\frac{1}{2}$  the fall-off of a similar light source in the real world. That is, it would have  $\frac{1}{2}$  the intensity at 2x the distance, if it were a point source.

### Default quadratic spotlight



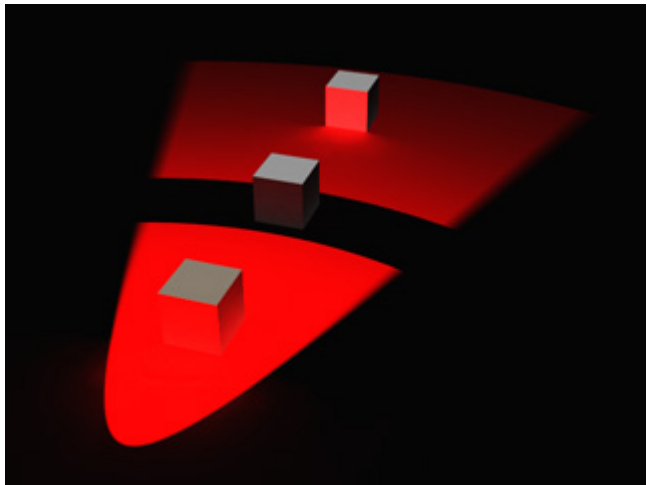
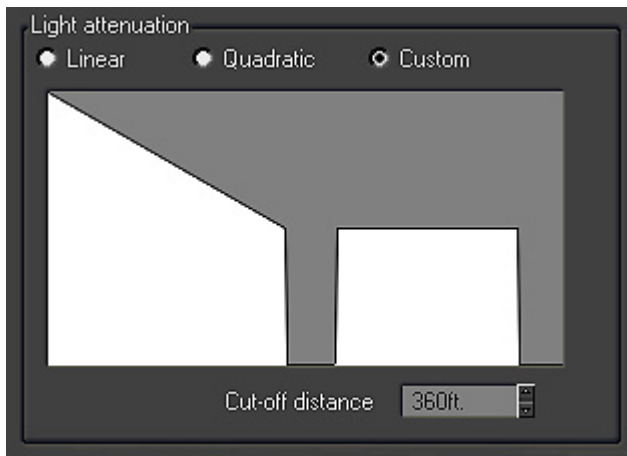
The quad light sources are for when your image need lights with a natural intensity fall-off with distance. For a point source, that would be the natural "Inverse Square Law" fall-off of an omni source in the real world.

By the Inverse Square Law, all point source radiation has an intensity that goes to  $\frac{1}{4}$  for each doubling of distance. This makes sense when you consider that at twice the distance the light must cover twice the area both horizontally AND vertically.

But for any spotlight the fall-off is more gradual with distance than for a point (omni) light, because all the light energy is concentrated into a beam.

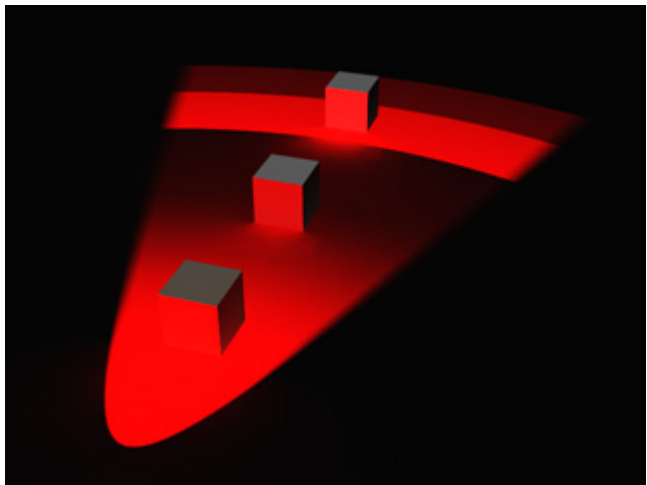
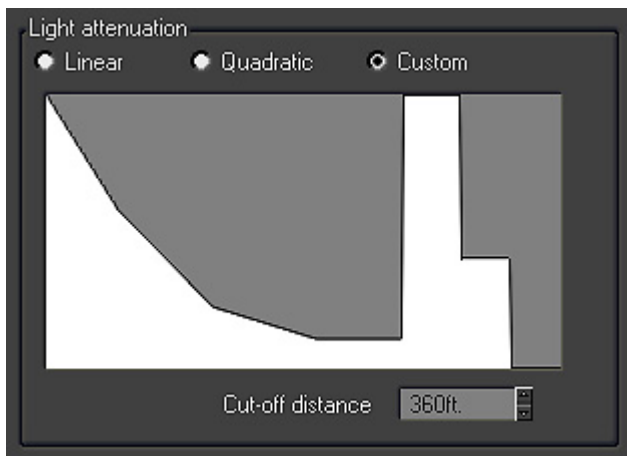
You create a custom distance fall-off by selecting the "Custom" radio button and then editing the curve any way you like.

## Spotlight with a notch at a specific distance



Above, I've created a zone of no light, at a distance along the beam that affects the 2<sup>nd</sup> cube. If the notch were not so deep, the light in that zone would only be attenuated, not zero. I've also set the area past the 2<sup>nd</sup> cube to a constant intensity value. But of course the beam is still widening with distance, so it still slowly gets dimmer with distance. And I cur the beam sharply at the end.

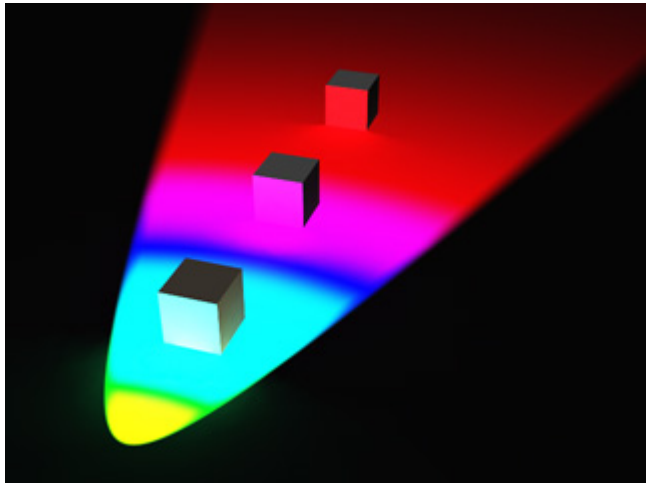
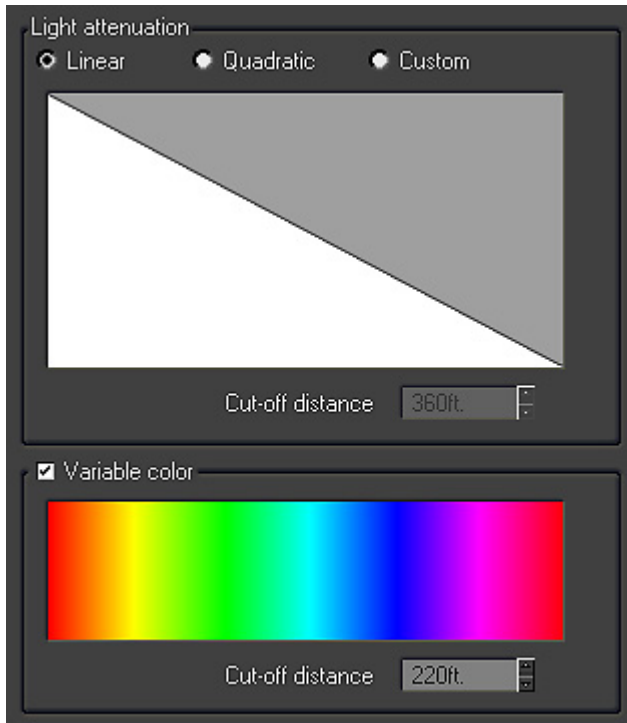
## Spotlight with a bump at a specific distance



This is the opposite effect to the last one. And this is how you make a distant surface as bright as a near one. Notice that the 2<sup>nd</sup> cube is dimmer than the other 2. Also note that an arbitrary distance past the 3<sup>rd</sup> cube is also brightened and given a sharp cutoff – just as an example.

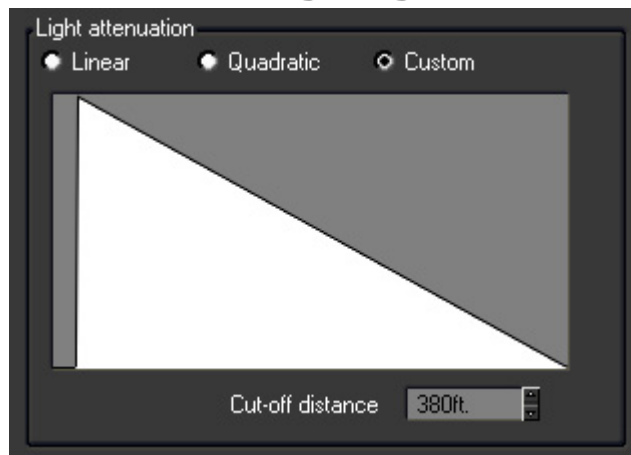
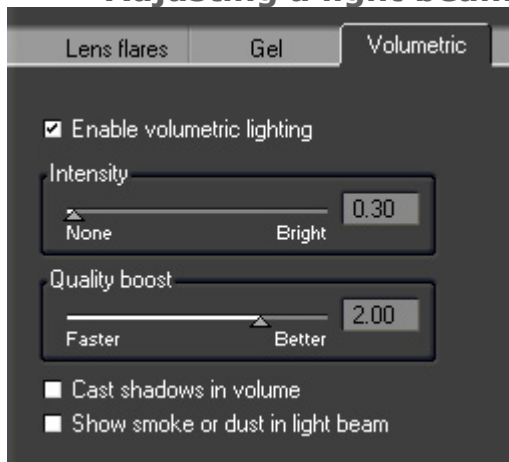
Here's a hint about building these filters. Use a camera above your scene and temporarily set your light source up as faintly volumetric. Then you can do quick renders to view the exact result – like in my scene illustration top view above.

## Spotlight with a rainbow color map

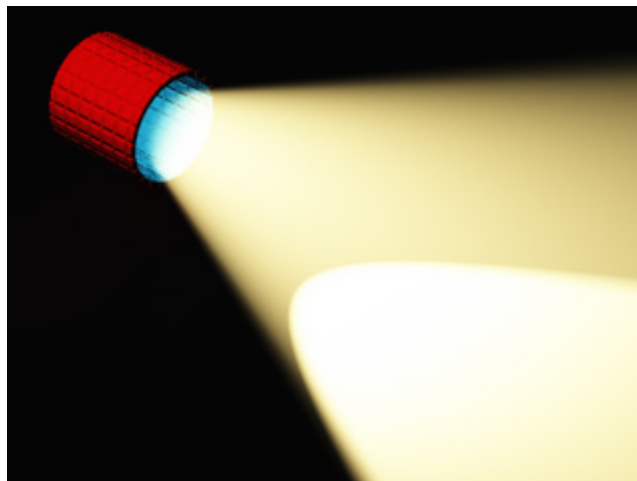


Here, you just load or create a color map and make the light source color full white.

## Adjusting a light beam to a model of a lighting device



We use a volumetric effect to make the light cone visible. Then we notch out a distance equal to where we want our beam to start. That's at the aperture of your light fixture.



That's all for now... hope this was helpful!

\_jim coe  
[Art-Head-Start.com](http://Art-Head-Start.com)

'*Art Head Start*' is my ebook of art skills and fundamentals for art students.  
Printed book planned for 2009 1<sup>st</sup> quarter.

© jim coe 2009