

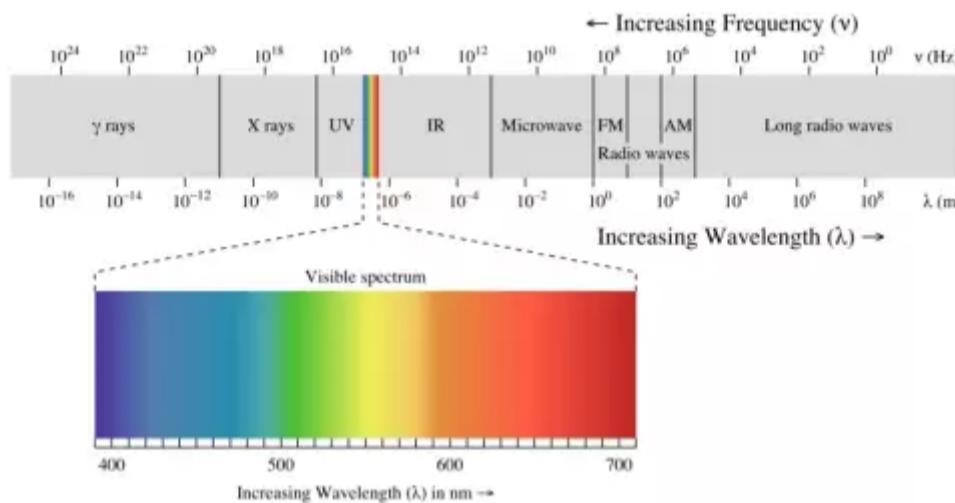
How to see the invisible infrared world using your mobile phone camera

 April 4th, 2010  53 comments

Using your mobile phone, you can see [infrared radiation](#) – a normally invisible part of the electromagnetic spectrum. Ken's Tech Tips looks at some of the physics of electromagnetic waves and explains how you can see this invisible world – and you don't need anything more than the mobile phone in your pocket.

What is infrared radiation?

Infrared is a form of electromagnetic radiation. Other forms of electromagnetic radiation (EM radiation) include visible light, x-rays, microwaves (the [EM waves that wi-fi networks use](#) and also the waves that cook your food in microwave ovens) and radio waves. The difference between all these different forms of radiation are the wavelength of the EM wave. We can illustrate this electromagnetic spectrum (CC-licensed image [from Wikipedia](#)):



What is the difference between visible light and infrared?

Visible light and infrared are both forms of electromagnetic radiation but with different wavelengths. Visible light has a wavelength of between 400nm and 700nm (a nanometer is so small that we can fit 1,000,000,000 in just 1 meter). We can only "see" the EM radiation in this range. At 700nm and longer, we enter the realm of infrared radiation.

Why can mobile phone cameras "see" infrared?

Most cameras are designed to capture an image of what people can see. Hence a good camera would only detect EM radiation in the visible light spectrum (between 400nm and 700nm).

Yet the [charged couple devices](#) used within cameras are typically manufactured to pick up EM radiation between 300nm and 1100nm. This means they are capable of detecting infrared light too (between 700nm and 1100nm is infrared).

To improve image quality, camera manufacturers typically add films and filters to block out infrared light and ensure only visible light reaches the CCD. If the infrared radiation was recorded by the camera and appeared in our photos, the photos would not be an accurate representation of what we can see – i.e. what we want to photograph!

Mobile phone cameras tend to be produced a lot cheaper than proper digital cameras and hence the vast majority of mobile phone cameras have a much thinner film/filter to block out infrared light. The lack of infrared filter is one reason photographs taken on mobile phones don't look as good as those taken on proper digital cameras but it also provides us with an opportunity to use our mobiles to "see" in infrared.

How can I harness this fact?

Simply point your mobile phone camera towards a infrared light source and you can begin to see this new invisible infrared world!

For example, stick your phone camera in front of a television remote control and start pressing some buttons: you'll see a few flashes of

sensor bar. You'll notice the sensor bar emits invisible IR radiation (this is how the Wiimotes track your movement).

Unfortunately, you won't see the world in true infrared. Your mobile phone camera is sensitive to visible light too – and fortunately (although unfortunately in our case) this always registers much brighter on the CCD and drowns out the infrared image. If you're really serious about seeing the world in infrared, you can pick up an [infrared filter from Amazon](#)^{*}. These filters will block out visible light and hence allow you to get a better image of the invisible infrared world.

Your Comments 53 so far

We'd love to hear your thoughts and any questions you may have. So far, we've received 53 comments from readers. You can [add your own comment here](#).



Steve Harris MD said:

[January 2, 2022 at 6:10 pm](#)

Infrared is not stopped by any of the dies that are used to print conventional films for projection. Therefore, you can make a pretty good infrared filter, by simply preparing a film projection "slideshow" using slides that have been unexposed, and are therefore black after development.

The trick is that you need a camera store where you can get them to mount 25 pieces of unexposed but developed cheap photographic film. You have to tell them to do it, or else they won't, since they look black and worthless. Just buy the cheapest 35 mm film you can find, and handed over to be "developed." Tell them that you want 25 totally black slides for projection. Those slides will be 25 infrared filters, and pretty good ones. You can use them on anything including over the lens of your normal video cameras. They also filter light sources very well especially one on top of another. Looking at one of these through an infrared camera will show you that it is black in the visible but completely transparent in the infrared. Lots of fun.

[Reply](#)



Royc said:

[December 15, 2021 at 11:45 am](#)

Very interesting! The understanding that we only see a small fraction of the light spectrum fascinates me! Are there any apps or "physical filters" i can use to convert the non-visible light spectrum to a visible spectrum? Love the idea of taking pictures with the "converted" spectrum added in, more so curious what id see!!

[Reply](#)



alan MICHAEL prince said:

[March 27, 2021 at 11:18 am](#)

Hi Ken

My wife took a picture of our garden in sunlight and was amazed to see a black object[not seen at the time of taking the photo] seemingly to hover in front of the tree.

This object was black about a foot long with undulations along its length and an angled shoulder at the end and 2 protruding prongs from the end.

I was pointed at 45degees to the ground towards a central upright bird bath.

I could find no objects in the garden that may have been blown in by the wind.

ANY IDEAS?



Gaber Rock replied:
[June 12, 2022 at 9:21 pm](#)

Can we see this picture?

[Reply](#)

[Load more comments \(49\)](#)

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About Ken



My passion is helping people to get the most out of their mobile phone. I've been blogging at Ken's Tech Tips since 2005.

Aside from writing about mobile technology, I have an interest in software development, digital marketing and physics. Outside of the blog, I work with numerous technology companies helping them to market their product to consumers. [Find out more](#).

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