

WiTricity-Wireless Electricity

Our forefathers marveled at the invention of glowing light bulbs by [Thomas Edison](#) in 1879. However, to us 21st centuryers, the [light bulb](#) is nothing out of the ordinary. When computers, cellphones, laptops, iPods, etc. were invented our antennae were ached. Now this is what you call invention! However, as time's progressing we are getting used to these devices. In fact, charging all these appliances has become so very cumbersome.

Each appliance has its own set of chargers, and with every family member owning their [cellphones](#), the drawers are overflowing with all sorts of wires. How many times have you wished if there could be some way to do away with all the wiry clutter? When you are on the way to work and your cellphone beeps in hunger for a battery charge, haven't you wished for your [cellphone battery](#) to get 'self charged'. Well your plight has been heard by doctor 'WiTricity'.

What is WiTricity?

WiTricity is nothing but wireless [electricity](#). Transmission of electrical energy from one object to another without the use of wires is called as WiTricity. WiTricity will ensure that the cellphones, laptops, iPods and other power hungry devices get charged on their own, eliminating the need of plugging them in. Even better, because of WiTricity some of the devices won't require batteries to operate.



What's the Principle behind WiTricity?

WiTricity - Wireless Electricity, these words are simple but a little complex. However, if you want to understand it, try and picture what I state in the next few lines. Consider two self-resonating copper coils of the same resonating frequency with a diameter of 20 inches each. One copper wire is connected to the power source (WiTricity transmitter), while the other copper wire is connected to the device (WiTricity Receiver).

The electric power from the power source causes the copper coil connected to it to start oscillating at a particular (MHz) frequency. Subsequently, the space around the copper coil gets filled with non-magnetic radiations. This generated magnetic field further transfers the power to the other copper coil connected to the receiver. Since this coil is also of the same frequency, it starts oscillating at the same frequency as the first coil. This is known as 'coupled resonance' and is the principle behind WiTricity.

The Brain behind WiTricity?

Prof. Marin Soljacic from Massachusetts Institute of Technology (MIT), is the one who has proved that magnetic coupled resonance can be utilized in order to transfer energy without wires. What's even more interesting is how he came about this idea. So Soljacic, just like any of us was fed up of his 'low battery' beeping cell phone and

wondered just like any of us if there was a way to get rid of this 'charging problem'. However, here is where the difference between Soljacic and any of us comes in. He didn't just stand there wondering, instead he tried to figure out if there existed any physical phenomenon which could be of some help. He remembered Michael Faraday's discovery of electromagnetic induction (1831) and used it to come up with WiTricity.

MIT's Experiment:

In 2007, Marin Soljacic led a five member team of researchers at MIT (funded by Army Research Office, National Science Foundation and the Department of Energy) and experimentally demonstrated transfer of electricity without the use of wires. These researchers were able to light a 60W bulb from a source placed seven feet away, with absolutely no physical contact between the bulb and the power source.

The first copper coil (24 inches in diameter) was connected to the power source and the second was connected to the bulb, and were made to resonate at a frequency of 10 MHz. The bulb glowed even when different objects (like a wooden panel) were placed between the two coils. The system worked with 40% efficiency and the power that wasn't utilized remained in the vicinity of the transmitter itself, and did not radiate to the surrounding environment.

Is WiTricity a New Concept?

No, this concept of wireless electricity is not new. In fact it dates back to the 19th century, when Nikola Tesla used conduction-based systems instead of resonance magnetic fields to transfer wireless power. Further, in 2005, Dave Gerding coined the term WiTricity which is being used by the MIT researchers today.

Moreover, we all are aware of the use of **electromagnetic radiation** (radio waves) which is quite well known for wireless transfer of information. In addition, lasers have also been used to transmit **energy** without wires. However, radio waves are not feasible for power transmissions because the nature of the radiation is such that

its spreads across the place, resulting into a large amount of radiations being wasted. And in the case of lasers, apart from requirement of uninterrupted line of sight (obstacles hinders the transmission process), it is also very dangerous.

What's so Unique about Soljacic's experiment?

What Soljacic's team has done is that they have specifically tuned the transmitting unit to the receiving device. The transmission is also not hindered by the presence of any object in the line of sight. If the object to be charged is in the vicinity of the WiTricity source, then the energy transfer will undoubtedly take place.

In this 'coupling resonance' system, the electric energy that is not used up by the receiver does not get radiated into the surrounding environment, but remains in the vicinity of the transmitter. This ensures safety as well as minimal wastage of power. One of the five researchers, Dr. Aristeidis Karalis says that their coupling resonance system is one million times more efficient as compared to that of Nikola Tesla.

Why was WiTricity not developed before?

It is often said 'necessity is the best teacher' and can be applied in this case as well. Only in this century, has the need for wireless electricity emerged so rapidly, spearheaded by the agony caused by the cumbersome charging of endless devices. Earlier people didn't need it, so they didn't think about it.

How Safe is WiTricity?

Human beings or other objects placed between the transmitter and receiver do not hinder the transmission of power. However, does magnetic coupling or resonance coupling have any harmful effect on humans? MIT's researchers are quite confident that WiTricity's 'coupling resonance' is safe for humans. They say that the magnetic fields tend to interact very weakly with the biological tissues of the body, and so are not prone to cause any damage to the living beings.

What's the Future of WiTricity?

MIT's WiTricity is only 40 to 45% efficient and according to Soljacic, they have to be twice as efficient to compete with the traditional chemical batteries. The team's next aim is to get a robotic vacuum or a laptop working, charging devices placed anywhere in the room and even robots on factory floors. The researchers are also currently working on the health issues related to this concept and have said that in another three to five years time, they will come up with a WiTricity system for commercial use.

WiTricity, if successful, will definitely change the way we live. Imagine cellphones, laptops, digital cameras getting self-charged! Wow! Let's hope the researchers will be able to come up with the commercial system soon. Till then, we wait in anticipation!

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