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WIRELESS POWER TRANSMISSION

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ABSTRACT

This presentation is based on Wireless Power Transmission. It explains the types of WPT. How power is transmitted by means of modern methods such as Microwaves and Lasers. Finally, the applications of WPT is discussed.

I.INTRODUCTION

Wireless Power Transmission was first invented by Nikola Tesla .Later it was developed into a technology called HAARP.It consists of about 180 antennas and it can transfer power about 3.6MegaWatts.High Active Auroral Research Program, simply called HAARP is located in Alaska,US.It can able to change climate in any part of the world.About 60 Kms upwards there was traposphere, and here it was rich in Electromagnetic waves.By changing the density of the EM waves ,it can able to change weather.This was the first seed to the development of WPT.

II.HEADINGS

1.TYPES OF WPT

2.NEAR FIELD

3.FAR FIELD

4.RECTANNAS

5.LASER TRANSMISSION

6.IMPLEMENTATION

7.CONCLUSION

III.TYPES OF WPT

1.Near field (or) Non radiative
2.Far field (or) Radiative

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IV.NEAR FIELD

There are three types of Near field Transmission.

Inductive coupling is the oldest and most widely used wireless power technology, and virtually the only one so far which is used in commercial products. It is used in inductive charging stands for cordless appliances used in wet environments such as electric toothbrushes and shavers, to reduce the risk of electric shock.

Resonant coupling is the second one.In 2007 a team led by Marin Soljačić at MIT used two coupled tuned circuits each made of a 25 cm self-resonant coil of wire at 10 MHz to achieve the transmission of 60 W of power over a distance of 2 meters (6.6 ft) (8 times the coil diameter) at around 40% efficiency.Soljačić founded the company WiTricity (the same name the team used for the technology) which is attempting to commercialize the technology.

Next one is Capacitive coupling.The transmitter and receiver electrodes form a capacitor, with the intervening space as the dielectric. An alternating voltage generated by the transmitter is applied to the transmitting plate, and the oscillating electric field induces an alternating potential on the receiver plate by electrostatic induction,which causes an alternating current to flow in the load circuit. The amount of power transferred increases with the frequency the square of the voltage.

4.1 PROS AND CONS OF NEAR FIELD

Transcutaneous surgery such as artificial heart pacemaker.In case the lithium ion battery in the pacemaker gets discharged,it can be charged with out any wire connections.Powermat at coffee shops,Electric tooth brushes and charging of cars paved their way in their domains.But a con is that it has very short range.

V.FAR FIELD

5.1 MICROWAVES

Power transmission via radio waves can be made more directional, allowing longer-distance power beaming, with shorter wavelengths of electromagnetic radiation, typically in the microwave range.A rectenna may be used to convert the microwave energy back into electricity.For example, the 1978 NASA study of solar power satellites required a 1-kilometre-diameter (0.62 mi) transmitting antenna and a 10-kilometre-diameter (6.2 mi) receiving rectenna for a microwave beam at 2.45 GHz.In 2017, the Federal Communication Commission (FCC) certified the first mid-field radio frequency (RF) transmitter of wireless power.

VI.RECTANNAS

Rectannas is a combination of Schottky diode and Dipole antenna.Schottky diode is used because it has low voltage drop and Dipole antenna is used since it receives signals from both sides.IMPATT diode is also used here,since it can able to generate out microwaves of high frequency.

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VII.LASER TRANSMISSION

In the case of electromagnetic radiation closer to the visible region of the spectrum (tens of micrometers to tens of nanometers), power can be transmitted by converting electricity into a laser beam that is then pointed at a photovoltaic cell.Laser transmission has no interference with any of the other waves such as radio waves.

NASA's Dryden Flight Research Center demonstrated a lightweight unmanned model plane powered by a laser beam.This proof-of-concept demonstrates the feasibility of periodic recharging using the laser beam system.

7.1. WHY MICROWAVE AND NO LASER

Because Laser can be transmitted over long range of THz,while in microwave it can be transmitted upto GHz range only.

VIII.IMPLEMENTATION

The project is based on the transmission of charge from one device to another device (ex: Smartphone) by means of Wireless Fidelity (WI-FI).WiFi is usually a transmission of Radio waves.The voltage is first converted into Radio waves by using Voltage to frequency converter which we will design it in the motherboard.The Radio waves are received using hotspot in the receiving device.Then the Radio waves are converted using Frequency to voltage converter.Thus the mobile is charged wirelessly.Switching circuit is used to differentiate between Transmitting and Receiving Waves.

IX.CONCLUSION

Ambient source of energy is one of the developing technology in recent times.Here the Power can be obtained from rubbing of clothes,River currents,Ocean tidal currents,Radio TX,etc.INNOWATECH is the company in US which is offering Power to 100 homes in Highways by Power generators,using this type of source.

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