

Optical Wireless Power Transmission (OWPT)

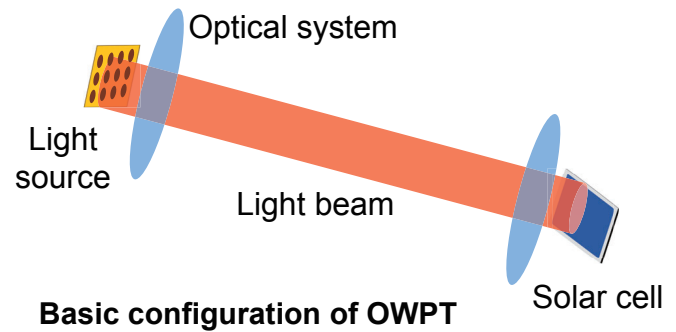
Photonics Integration System Research Center, FIRST

<http://vcSEL-www.pi.titech.ac.jp>

- Extension of applications of OWPT
- Construction of OWPT systems
- Research on photonic modules for OWPT
- Improvement of VCSEL for OWPT

Innovation by a true wireless society based on OWPT!

Following to the wireless communication, we can expect wirelessly power transmission. Optical wireless power transmission (OWPT) is promising from the features of small size, long distance, no electromagnetic wave interference. Toward the application development of OWPT and implementation to society, we are researching on the systems and devices and their high performance.

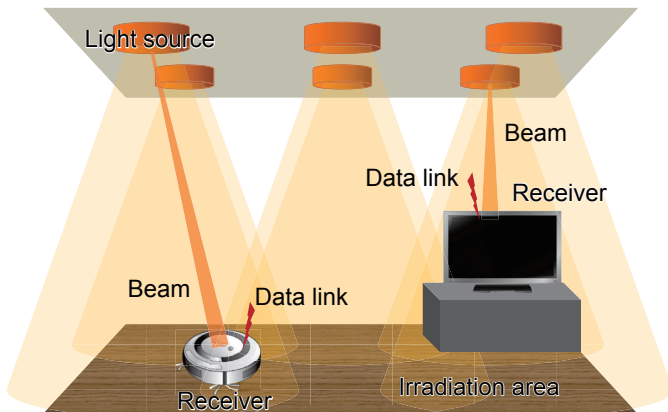


Basic configuration of OWPT

- Main modules are highly efficient light source, solar cell, and optical systems for beam control.

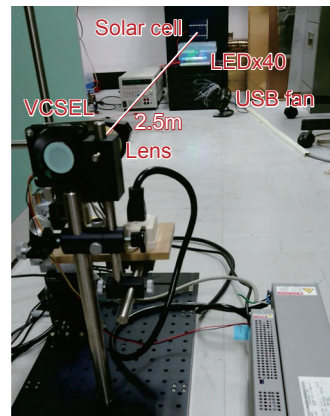
- **Simple system:** Light source, solar cell
- **Small size:** Laser/LED, solar cell
- **Long distance:** Beam transmission

- **High output:** High power light source
- **Simple circuit:** only DC circuit
- **Others:** no EMI, safety system



Schematic view of OWPT system in a room

- The goal is to apply not only to information equipment but also to all electric appliances.
- Expanding to various usage situations such as power supply to fixed equipment, power supply while moving.
- Advantages in system performance/function improvement, use in anytime and anywhere, etc.



OWPT prototypes using VCSEL and LED

- Output power of 10 W to a distance of 2.5-5 m by a high power VCSEL array (> 20 W). Solar cell efficiency is over 35%. Power supply efficiency can be up to 16%.
- LED light can be irradiated at 2-3 cm square at 1 m with light usage efficiency of over 50%. A power output of over 200 mW is confirmed using high brightness LED (> 1 W).