







# Development and validation of a model for the characterization of near field power flux of optical sources

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#### Description

In this work, a novel channel model for OWC channels is presented and validated experimentally. The channel model is based on the radiometric equations.

### Theoretical model

The obtained theoretical models are based on the convolution of the source functions and a geometrical kernel. The expression of this geometrical kernel depends on the fundamental symmetry of the source. Three kernels have been derived in this work (plane symmetry, cylindrical symmetry and spherical symmetry).

#### Data analysis

The obtained power distributions were compared using the Pearson correlation coefficient for every possible distance.



### Objectives

- To obtain a theoretical model
- To design a characterization system
- To validate the obtained model

## Experimental methodology

A measurement system was implemented in order to obtain experimental measures that could validate the mathematical models. A 3 DoF mechanical system was used to measure the received power along different positions in space and a pin Photodiode was used to receive the optical power. Two different sources were used.



### Results

The correlation coefficients validate the presented model for the flat source scenario. Further research will be needed to validate the cylindrical and spherical models.



#### Conclussions

A simple model for the behavior of the direct link component of an OWC channel has been derived and validated experimentally. Each and every of the goals stated for this project have been successfully fulfilled.