

# Master's thesis

In Cooperation with Fronius International GmbH



## Experimental and theoretical considerations on electromagnetic radiation of PV Systems.

### Context and motivation

In the pursuit of achieving climate-neutral energy supply, the number of photovoltaic (PV) installations is rapidly increasing worldwide. PV systems consist of solar panels, components with higher-frequency operation, and relatively extensive installations, often also utilized for communication purposes (Power Line Communication), inadvertently causing electromagnetic radiation. To safeguard communication services and prevent electromagnetic interference in the surroundings, electromagnetic radiation from these systems should be low and comply with possibly given limits. Achieving this necessitates a comprehensive understanding of the cause-effect relationships underlying the electromagnetic radiation emitted by PV installations, which can be considered the core objective of this study.

### Research topic(s)

Which components contribute to radiation emission in which frequency ranges?

How does the installation influence electromagnetic radiation emission?

To what extent does power line communication (PLC) contribute to radiation emission?

What measures contribute to the reduction and minimization of radiation emission?

### Approach/methodology/tasks

Familiarization with the topic and review of the current state of research and technology.

Delimitation of the scope of investigation and formulation of the approach.

Conducting calculations, developing a simulation model, and comparing it with measurements in real-world settings.

Considerations regarding influencing factors on radiation behaviour and verification.

Description of measures for reducing electromagnetic radiation emission and conclusion.

### Organizational matters

- Start: immediate
- Workplace: Fronius International GmbH; Location 4600 Thalheim/Wels

### Contact/supervisor

IFE: Univ. -Prof. Dr. techn. Bernd Deutschmann; [bernd.deutschmann@tugraz.at](mailto:bernd.deutschmann@tugraz.at)

Fronius: Peter Boxleitner ([boxleitner.peter@fronius.com](mailto:boxleitner.peter@fronius.com); +43 7242 241 5840)

Fronius: Ingomar Müller ([mueller.ingomar@fronius.com](mailto:mueller.ingomar@fronius.com); +43 7242 241 2316)