

<b>Title:</b>	<b>Diagnostics of crystalline silicon photovoltaic modules</b>
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<b>Type:</b>	Bachelor project
<b>Faculty:</b>	Faculty of Electrical Engineering
<b>Department:</b>	Electrotechnology
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## Evaluation

The thesis provides a sufficiently comprehensive study of the topic diagnostics of crystalline silicon photovoltaic (PV) modules.

It consists of two main parts- a theoretical part and a practical part.

In the first (theoretical) part the student describes PV cell technologies and the static and dynamic model of the PV cell. Based on the PV cell models a model of a complete PV module is derived.

The main three methods of diagnostics are described: impedance spectroscopy, electroluminescence and flash test measurement.

In the second part, these three methods are practically tested on selected mono- and multicrystalline silicon PV module samples. The results are presented in an organized manner. Figures and tables support the interpretation of results particularly well.

The structure is clear and logical. The student shows familiarity with the topics, also the citations are written in an appropriate style.

**Final grade: A**

## Supplementary questions:

- The described methods are appropriate for laboratory testing. How would you arrange an in-field measurement using these methods (if such a measurement is possible)?
- By using the flash test, the model parameters of the modules have been presented. The series resistance  $R_s$  is in all samples indicated 0  $\Omega$ . Is this a real value or was it a model precondition?
- Are these methods suitable for thin film modules as well?

Prague, 8.6.2015

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Ing. Petr Wolf, Ph.D.