

<b>Location of the infrastructure :</b>	Freiburg, Germany	<a href="http://www.ise.fraunhofer.de">www.ise.fraunhofer.de</a>
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<b>Objectives :</b>	<ul style="list-style-type: none"> <li>• Silicon material characterization at wafer level (Photoluminescence Imaging)</li> <li>• Silicon solar cell characterization (Photo- and Electroluminescence Imaging)</li> <li>• Lock-in thermography</li> </ul>
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<b>Main features :</b>	<ul style="list-style-type: none"> <li>• Imaging of Photoluminescence Intensity distribution after laser excitation (up to 125x125 mm<sup>2</sup>).</li> <li>• Calculation of quantitative carrier lifetime distribution from PL image on passivated silicon wafers</li> <li>• Determination of quantitative distribution of iron point defect distribution in p-type silicon wafers</li> <li>• Measurement of PL or EL intensity on cells at various voltages</li> <li>• EL intensity images under reverse bias for breakdown analysis</li> <li>• Lock-in thermography measurements for detection of shunts and reverse breakdown sites</li> </ul>
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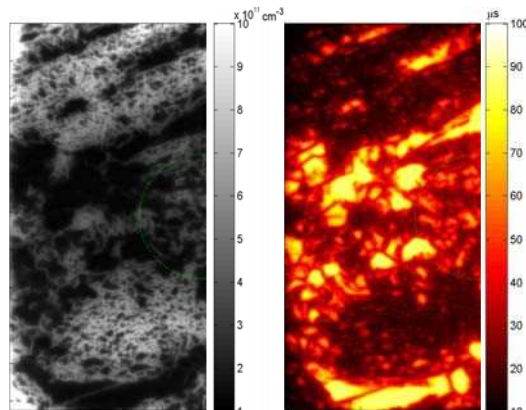


Figure 1: Quantitative imaging of interstitial iron (left) based on lifetime measurements before and after light soaking and recombination lifetime image on same sample of multicrystalline silicon (right).

<b>Limitations or constraints :</b>	The access will be allowed with technical and scientific assistance from ISE.
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<b>Typical services or results :</b>	<p>The state-of-the-art imaging analysis allows for a comprehensive analysis of material and solar cell quality in terms of recombination, voltage, and series resistance but also of shunts and breakdown sites.</p> <p>The material quality can be analyzed after various processing steps (samples to be provided by the visiting scientist).</p> <p>Support will be provided regarding measurement and sample requirements as well as the various analysis options.</p>
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<b>Examples of research projects :</b>	<ul style="list-style-type: none"> <li>• Analysis of impact of diffusion and other high-temperature steps on material quality (gettering, impurity precipitation)</li> <li>• Analysis of solar cell quality as a function of processing parameters under test</li> </ul>
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