| **Georg-August-Universität Göttingen**<br>**Module B.Phy.5625: X-ray physics** | 6 C<br>4 WLH |
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| **Learning outcome, core skills:** | **Workload:** |
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| Knowledge in:<br>• Radiation-matter interaction<br>• Dosimetry, radiobiology and radiation protection<br>• Scattering experiments: photons, neutrons and electrons<br>• Fundamental concepts in diffraction and Fourier theory<br>• Structure analysis in crystalline and non-crystalline condensed matter<br>• Generation of x-rays and synchrotron radiation<br>• X-rays optics and detection<br>• X-ray spectroscopy, microscopy and imaging<br>After taking the course, students<br>• will integrate fundamental concepts of matter-radiation interaction .<br>• are able to apply quantitative scattering techniques with short wavelength radiation for structure analysis of condensed matter, including problems in solid state, materials, soft matter, and biomolecular physics<br>• are able to plan and carry out x-ray laboratory experiments<br>• are prepared to participate in beamtimes at synchrotron, neutron or free-electron radiation sources<br>• can solve analytical problems in x-ray optics, diffraction and imaging | Attendance time:<br>56 h<br>Self-study time:<br>124 h |

| **Course: X-ray Physics** | |
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| **Examination: Written examination (120 minutes) or oral examination (ca. 30 min.) or presentation (ca. 30 min.)**<br>**Examination prerequisites:**<br>none<br>**Examination requirements:**<br>• solve problems of the topics mentioned above on a quantitative level, including calculations of structure factor, correlation functions,<br>• applications of Fourier theory to structure analysis and basic solutions to the phase problem,<br>• solve problems of wave optical propagation and diffraction<br>• knowledge about interaction mechanisms and order -of-magnitude estimations,<br>• knowledge about theoretical concepts and experimental implementations of different techniques,<br>• knowledge of laboratory skills (x-ray sources, detection, dosimetry) | 6 C |

| **Admission requirements:** | **Recommended previous knowledge:** |
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| none | none |
| **Language:** | **Person responsible for module:** |
| English, German | Prof. Dr. Tim Salditt |