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| Module title | | Abbreviation |
| Computational Astrophysics | | 11-NMA-161-m01 |
| Module coordinator | | Module offered by |
| Managing Director of the Institute of Theoretical Physics and Astrophysics | | Faculty of Physics and Astronomy |
| ECTS | Method of grading | Only after succ. compl. of module(s) |
| 6 | numerical grade | -- |
| Duration | Module level | Other prerequisites |
| 1 semester | graduate | -- |
| Contents | | |
| <p>Various methods used in astrophysical simulations with special emphasis on their applications. N-body algorithms (tree- and polynomial codes). Particle-mesh methods (particle-in-cell methods). Vlasow methods (e.g., Lattice-Boltzmann). Hyperbolic conservation laws (fluid dynamics, finite difference method, Riemann solver, ENO). Methods of high-performance computing. Message-passing interface (MPI). GPGPU programming (OPENCL).</p> | | |
| Intended learning outcomes | | |
| <p>The students are able to solve typical problems and equations of Astrophysics and other subdisciplines of Physics with the help of numerical simulations. They are especially capable of choosing adequate strategies to approach such problems and of validating the results.</p> | | |
| Courses (type, number of weekly contact hours, language — if other than German) | | |
| <p>V (3) + R (1) Module taught in: German or English</p> | | |
| Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus) | | |
| <p>a) written examination (approx. 90 to 120 minutes) or b) oral examination of one candidate each (approx. 30 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or d) project report (approx. 8 to 10 pages) or e) presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest. Assessment offered: In the semester in which the course is offered and in the subsequent semester Language of assessment: German and/or English</p> | | |
| Allocation of places | | |
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| Additional information | | |
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| Referred to in LPO I (examination regulations for teaching-degree programmes) | | |
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| Module appears in | | |
| <p>Master's degree (1 major) Physics (2016) Master's degree (1 major) Mathematical Physics (2016) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Master's degree (1 major) Physics (2020) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)</p> | | |



Master's degree (1 major) Mathematical Physics (2020)