

Module Name Interstellar Medium and Star Formation						
Type of Module Advanced Module				Module Code AM-IMSF		
Identification Number MN-CS-IMSF	Workload 270 Hours	Credit Points 9 CP	Term 1. – 3. Semester	Offered Every SuSe	Start Summer Term Only	Duration 1 Semester
1	Course Types a) Lectures b) Exercises		Contact Time 60 h 30 h	Private Study 90 h 90 h		Planned Group Size ca 30 Students
2	<p>Module Objectives and Skills to be Acquired</p> <p>The module consists of the two courses ‘Star Formation’ and ‘Physics of the Interstellar Medium’ each with separate lectures and exercises.</p> <p>Star Formation: Understanding of fundamental concepts of star formation in a variety of environments.</p> <p>Physics of the Interstellar Medium: Understanding the fundamental processes structuring the interstellar medium (ISM) and ways to observe them.</p>					
3	<p>Module Content</p> <p>Star Formation: The lecture introduces the basic aspects of Star Formation: Physical Processes in the ISM, Interstellar Chemistry, ISM and Molecular Clouds, Equilibrium Configurations and Collapse, Protostars, Formation of High Mass Stars, Jets, Outflows, Disks, Pre-main sequence stars, Initial Mass Function, Structure of the Galaxy, Starburst Galaxies, Star Formation in the early Universe</p> <p>Physics of the Interstellar Medium: The dynamics of the interstellar gas, hydrodynamic instabilities, turbulence. Formation of and radiation from interstellar gas, dust and polycyclic aromatic hydrocarbons. The energy balance of the ISM, phases of the ISM and chemical phase transitions, Special interstellar regions: HII regions, diffuse Galactic clouds, molecular clouds, photon-dominated regions and X-ray dominated regions, interstellar shocks and supernova remnants, planetary nebulae</p>					
4	<p>Teaching Methods</p> <p>Lectures and exercises</p>					
5	<p>Prerequisites (for the Module)</p> <p>Formally: none Regarding the content: Advanced Astrophysics</p>					
6	<p>Type of Examination</p> <p>One oral examination at the end of the module regarding the contents of both courses</p>					

7	<p>Credits Awarded</p> <p>The module is passed by passing a oral examination. The grade given for the module is equal to the grade of the oral examination.</p>
8	<p>Compatibility with other Curricula</p> <p>None</p>
9	<p>Proportion of Final Grade</p> <p>9/114</p>
10	<p>Module Coordinator</p> <p>Prof. Dr. Peter Schilke, Dr. Volker Ossenkopf</p>
11	<p>Further Information</p> <p>Recommended literature Star Formation: Palla and Stahler, Formation of Stars (Wiley) Carroll and Ostlie, An Introduction to Modern Astrophysics (Addison-Wesley) Shu, The Physics of Astrophysics I & II (University Science Books, Mill Valley) Tielens, The Physics and Chemistry of the Interstellar Medium (Cambridge University Press) Spitzer, Physical Processes in the Interstellar Medium (Wiley) Unsöld and Baschek, Der neue Kosmos (Springer, Berlin)</p> <p>Recommended literature Physics of the Interstellar medium: B.T. Draine: Physics of the Interstellar and Intergalactic Medium (Princeton Series in Astrophysics) A.G.G.M. Tielens: The Physics and Chemistry of the Interstellar Medium (Cambridge University Press) K.R. Lang: Astrophysical Formulae (Springer Study Edition)</p>