

<b>Study programmes:</b> Astronomy and Astrophysics – PhD Studies			
<b>Course name:</b> Evolution of supernova remnants			
<b>Lecturers:</b> Bojan Arbutina			
<b>Status:</b> optional			
<b>ECTS:</b> 9			
<b>Attendance prerequisites:</b> none			
<b>Course aims:</b> Acquiring advanced knowledge about magnetohydrodynamical and radio evolution of supernova remnants.			
<b>Course outcome:</b> At the end of the course, student has enough skills to start a research concerning magnetohydrodynamical and radio evolution of supernova remnants (shock waves, phase of evolution, radio evolution i.e. $\Sigma$ -D relation, statistical analysis).			
<b>Course content:</b> Historical introduction. Supernovae: type I and II, supernova rates. Observational characteristics of supernova remnants in optical radio and X-rays. Radio supernovae. Hydrodynamical evolution: free expansion, adiabatic phase, radiative phase, dissipation. Radio evolution: $\Sigma$ -D and L-D relations, statistics of supernova remnants.			
<b>Literature:</b> 1. Lequeux, J., Falgarone, E. & Ryter, C.: 2004, <i>The Interstellar Medium</i> , Springer, Rohlfs K., Wilson T.L., 1996, <i>Tools of Radio Astronomy</i> , Berlin, Heidelberg: Springer-Verlag, 2. Woosley, S. E., Weaver, Thomas A., 1986, <i>The physics of supernova explosions</i> , Annu. Rev. Astron. Astrophys., 24, 205 3. Weiler, Kurt W., Sramek, Richard A., 1988, <i>Supernovae and supernova remnants</i> , Annu. Rev. Astron. Astrophys., 26, 295 J4. acco V., 2012, <i>Supernova remnants: the X-ray perspective</i> , Astron. Astrophys. Rev., 20, 49			
<b>Excercises:</b> Arbutina B., 2012, <i>Supernovae and their remnants</i> , Belgrade			
<b>Number of hours:</b> 10	<b>Lectures:</b> 4	<b>Tutorials:</b> 6	
<b>Teaching and learning methods:</b> Ex cathedra, group work, student research			
<b>Grading system (maximum number of points: 100)</b>			
<b>Pre-exam requirements</b>	points	<b>Final exam</b>	points
Lectures	-	Written exam	-
Excercises / Tutorials	-	Oral exam	60
Colloquia	40	Written-oral exam	-
Essay/Project	-		