

<b>Module:</b>	<b>Elective Advanced Lectures: Observational Astronomy</b>
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<b>Module No.:</b> astro840
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<b>Course:</b>	 universität <b>bonn</b>	<b>Multiwavelength Observations of Galaxy Clusters</b>
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<b>Course No.:</b> astro849
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Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture with exercises	English	2+1	4	ST

<b>Requirements for Participation:</b>
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<b>Preparation:</b>
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Introductory Astronomy lectures
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<b>Form of Testing and Examination:</b>
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Written or oral examination, successful exercise work
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<b>Length of Course:</b>
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1 semester
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**Aims of the Course:**

To introduce the students into the largest clearly defined structures in the Universe, clusters of galaxies. In modern astronomy, it has been realized that a full understanding of objects cannot be achieved by looking at just one waveband. Different phenomena become apparent only in certain wavebands, e.g., the most massive visible component of galaxy clusters - the intracluster gas - cannot be detected with optical telescopes. Moreover, some phenomena, e.g., radio outbursts from supermassive black holes, influence others like the X-ray emission from the intracluster gas. In this course, the students will acquire a synoptic, multiwavelength view of galaxy groups and galaxy clusters.

**Contents of the Course:**

The lecture covers galaxy cluster observations from all wavebands, radio through gamma-ray, and provides a comprehensive overview of the physical mechanisms at work. Specifically, the following topics will be covered: galaxies and their evolution, physics and chemistry of the hot intracluster gas, relativistic gas, and active supermassive black holes; cluster weighing methods, Sunyaev-Zeldovich effect, gravitational lensing, radio halos and relics, and the most energetic events in the Universe since the big bang: cluster mergers.

**Recommended Literature:**

Lecture script and references therein