

Colloquium

SFB 956

Conditions and Impact of Star Formation

06.11.2017

Monday 3:00 pm

Max-Planck-Institut für Radioastronomie

Auditorium 0.02

Auf dem Hügel 69 | 53121 Bonn

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Illuminating the Dark Universe with Fluorescent Lyman-alpha Emission

Gravitational collapse during the Universe's first billion years transformed a nearly homogeneous matter distribution into a network of filaments - the Cosmic Web - where galaxies form and evolve. Because most of this material is too diffuse to form stars, its study has been limited so far to absorption probes against background sources. In this talk, I will present the results of a new program to directly detect and study high-redshift cosmic gas in emission using bright quasars and galaxies as external "sources of illumination". In particular, I will show results from ultra-deep narrow-band imaging and recent integral-field-spectroscopy as a part of the MUSE Guaranteed Time of Observation program that revealed numerous giant Lyman-alpha emitting filaments extending up to several hundred kpc around quasars and bright galaxies. I will discuss how the unexpectedly high luminosities of these systems, together with the constraints from Helium and metal extended emission, represent a challenge for our current understanding of cosmological structure formation. In particular, I will show that current observations suggest that a large amount of "cold" and dense gaseous "clumps" should be present around high-redshift galaxies and I will present our first attempts to understand the origin and nature of these structures using high-resolution hydrodynamical simulations.

