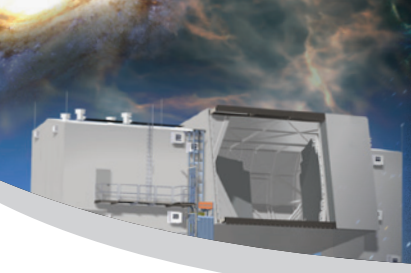


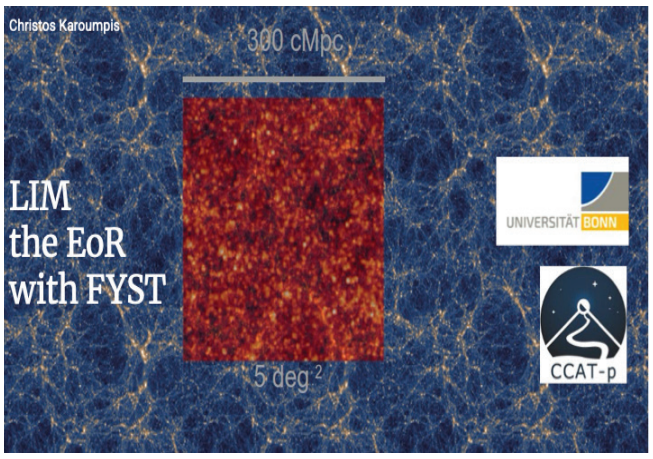
CRC1601

# COLLOQUIUM

CRC 1601 HABITATS OF MASSIVE STARS ACROSS COSMIC TIME

**April 08, 2025**

University of Cologne
Physics Institutes
Lecture Hall III, 2:00 pm

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## Line intensity mapping the Epoch of Reionization with the Fred Young Submillimeter Telescope

Most of the baryonic matter in the universe, which exists primarily as intergalactic hydrogen, was ionized by the far-UV radiation of early galaxies during the Epoch of Reionization (EoR). However, many of these faint galaxies remain undetectable by traditional surveys. Line intensity mapping (LIM) addresses this limitation by measuring the integrated emission from entire galaxy populations. By post-processing the IllustrisTNG300 simulation, we produced mock [CII] line observations tailored to the specifications of the upcoming Fred Young Submillimeter Telescope (FYST).

Our forecasts suggest that detecting [CII] line emission up to z ≈ 6.5 is feasible. A significant challenge, however, is the contamination from CO lines emitted by lower-redshift galaxies, which overlap in observational frequency with high-redshift [CII]. To address this challenge, we modeled the CO foreground and applied a masking technique to mitigate its impact. While [CII] line emission likely dominates at redshifts below 5, extensive masking is required to recover the [CII] signal around z ≈ 6, and more advanced foreground separation methods will be needed to probe redshifts beyond 6. This ongoing work will help unlock the full potential of FYST to trace galaxy evolution during and immediately after the EoR using the LIM technique.