LIM25 - Annecy



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Learning about the EoR with multi-line intensity mapping

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LIM of the 21cm line with the SKA enables us to map the first billion years of our Universe, including the Epoch of Reionization (EoR), to gain valuable insights into the growth of structure, the intergalactic medium and the properties and environments of ionising sources. While 21cm IM traces neutral hydrogen, UV and optical to infrared line emission that trace (partly) ionised gaseous media provide complementary information. LIM of these additional lines is well-suited for cross-correlation with 21cm maps both to ensure detection robust against systematics and foregrounds and to gain further information on diffuse gaseous media. In this talk, I will present LIM advancements and updated prospects for cross-correlation with SKA-low measurements. Using mock LIM mappings that cover large survey volumes and explore astrophysical parameter spaces, I showcase the most promising lines for cross-correlation during the EoR, such as the Lyman hydrogen line as measured by the SPHEREx satellite as well as lesser-explored dust tracer lines in the infrared as measured by JWST. I will conclude by highlighting the insights we can gain, particularly from the LIM-21cmIM cross-correlation, such as evolution of IGM morphology and UV escape from ionising sources.

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