## LIM25 - Annecy



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## The COMAP power spectrum methodology towards a future CO detection

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In this talk, we will present the state-of-the-art COMAP power spectrum methodology, discuss key lessons learned since the COMAP Season 2 release, and mention some advantages of a joint COMAP-Pathfinder and COMAP-Wide analysis. The COMAP power spectrum methodology relies on cross-correlating maps made by specific configurations of detectors and elevations, each with largely independent associated detector- or elevation-specific systematic effects. This yields a CO estimator that is both sensitive and robust against systematic effects. Furthermore, the methodology can easily be adapted to other experiments and incorporated into any existing or future end-to-end cosmological data analysis pipeline. This will be especially important in the coming years when integrating down towards the first CO LIM detections and jointly analyzing data sets like those of the COMAP-Pathfinder, COMAP-Wide, and others. As the sensitivity of COMAP is approaching that needed to detect a signal at the level of our fiducial model, we will consider how to balance the sensitivity and robustness against systematic effects. We will also show some correlations in  $(k_{\perp}, k_{\parallel})$ -space not yet accounted for, and how we can use our power spectrum methodology to investigate the origin and morphology of systematic effects in  $(k_{\perp}, k_{\parallel})$ -space.

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