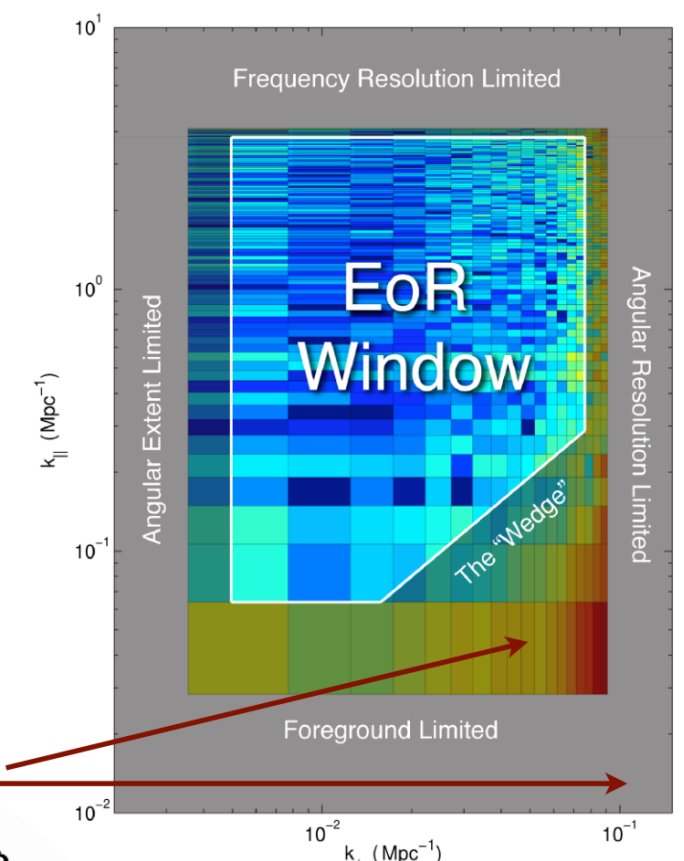


CMB-IM Synergies

Astro2020 CMB White Papers:
<https://zzz.physics.umn.edu/decadal2020/doku.php?id=start>

- Reionization
 - Direct complementarity: kinematic SZ and 21cm
 - Cross-correlations challenging due to mode non-overlap
 - Higher-order statistics?
 - Joint interpretation/analysis
 - Non-reionization:
 - CMB lensing x IM
 - Thermal SZ x IM
 - Any killer apps here?
 - Particular IM lines of interest?
- Galaxy surveys mostly measure modes lost from 21 cm data set to foreground cleaning/avoidance.
- 
- The figure is a log-log plot with $k_{\parallel}$ (Mpc $^{-1}$) on the vertical axis and $k_{\perp}$ (Mpc $^{-1}$) on the horizontal axis. The vertical axis ranges from 10^{-2} to 10^1 , and the horizontal axis ranges from 10^{-2} to 10^{-1} . A central blue region is labeled 'EoR Window'. Surrounding this are various shaded regions: 'Frequency Resolution Limited' at the top, 'Angular Extent Limited' on the left, 'Angular Resolution Limited' on the right, and 'Foreground Limited' at the bottom. A diagonal line labeled 'The "Wedge"' separates the EoR Window from the foreground-limited region. A red arrow points from the text 'Galaxy surveys mostly measure modes lost from 21 cm data set to foreground cleaning/avoidance.' towards the foreground-limited region.
- Dillon + 2014
- 100 MHz - 100 GHz foreground modeling

CMB context: Simons Observatory funded (2021-2026+); CMB-S4 proposed (2027-2034); various satellites proposed