THE SURPRISING COMPLEXITY OF DIFFUSE AND TRANSLUCENT CLOUDS TOWARD SGR B2: DIATOMICS AND COMs FROM 4 GHz TO 1.2 THz

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Many diffuse and translucent clouds lie along the line of sight between Earth and the Galactic Center that can be probed through molecular absorption at characteristic velocities. We highlight results of a study of diffuse and translucent clouds along the line of sight to Sgr B2, including SOFIA observations of SH near 1.4 THz and GBT PRIMOS observations from 4 to 50 GHz. We find significant variation in the chemical conditions within these clouds, and the abundances do not appear to correlate with the total optical depth. Additionally, from the GBT observations, we report the first detections of multiple complex organic molecules (COMs) in diffuse and translucent clouds, including CH_3CN, HC_3N, CH_3CHO, and NH_2CHO. We compare the GBT results to complementary observations of SH, H_2S, and others at mm, sub-mm, and THz frequencies from the NRAO 12m, Herschel HIFI, and SOFIA facilities, and comment on the insights into interstellar sulfur chemistry which is currently not well constrained.