INTERSTELLAR N_2 IN THE DIFFUSE ISM TOWARD 20 AQUILAE

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Molecular nitrogen (N_2) is the most abundant molecule in the Earth's atmosphere and in the less chemically-processed atmosphere of Titan. N_2 is also of considerable interest for studies of the interstellar medium because both models of steady-state gas-phase chemistry (Viala 1986) and millimeter wave observations of N_2H^+ (Womack, Ziurys, & Wyckoff 1992) predict that N_2 should be the dominant nitrogen-bearing molecule in interstellar space. We previously presented the first detection of interstellar N_2 toward HD 124314 with an observed fractional abundance of N_2/H_2 = x(N_2) = 3.3 $\times$ 10^{-7} (Knauth et al. 2004). Here we report on the second detection of interstellar N_2 based on *Far Ultraviolet Spectroscopic Explorer* ($FUSE$) observations of the moderately-reddened star 20 Aquilae (Knauth et al. 2005) with $x(N_2) \sim 4.7 \times 10^{-8}$. This fractional abundance is surprisingly low given that 20 Aql has a factor-of-4 higher CN abundance than that found toward HD 124314. Is this possible anti-correlation caused by differences in the predictions of diffuse and dark cloud chemistry? Recent work (Herbst 2004, private communication; Roueff 2005) show that a single homogeneous cloud chemical model cannot reproduce the observations. Further observations of interstellar N_2 and other nitrogen-bearing species (e.g., NH) toward lines of sight with different physical conditions are required to understand the implications for interstellar nitrogen chemistry.