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Effects of Fermi Statistics on Trimer Formation in Ultralong-Range Rydberg Molecules[1] J D WHALEN, R DING, S K KANUNGO, F B DUNNING, T C KILLIAN, Rice University — Excitation of a Rydberg atom in a cold, dense gas leads to the creation of bound states known as ultralong-range Rydberg molecules comprising one, two, or more bound ground-state atoms. The molecular potential formed by the scattering of the Rydberg electron from nearby ground-state atoms. The excitation probability of a Rydberg molecular state depends on the electronic state (n, ℓ) and the degree of spatial correlation between background ground-state atoms. The anti-correlated nature of a gas of spin-polarized fermions reduces the probability for finding two particles separated by less than their thermal de Broglie wavelength, which leads to changes in the molecular formation rate. We present molecular spectra for spin-polarized and unpolarized samples of fermionic ^{87}Sr (F=9/2), which highlight the effects of particle statistics on molecule formation.

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