Three fermions with high angular momentum in the unitarity limit YU-HSIN CHEN, CHRIS GREENE, Purdue University — This study considers the unitary limit of three equal mass fermions having total orbital angular momentum $J^{\Pi} = 1^{-}$, specifically consisting of two spin-up and one spin-down fermion ($\downarrow\uparrow\uparrow$). Our results agree with previous work by Castin and by Blume *et al.* in the limit where the s-wave scattering length goes to infinity. To explore another type of unitarity limit, we have derived numerical results for the regime where the p-wave scattering volume approaches infinity. This exploration has also considered different interactions between the atoms in different spin states, for example, the case where the two spin-up fermions have a p-wave interaction but where a spin-up atom interacting with a spin-down atom has a strong s-wave interaction. There are universal states that can be derived for both of the above two cases. Time permitting, this work may also analyze the rates for three-body recombination and atom-dimer dissociation in the limit of a large p-wave scattering volume for such systems involving three fermionic atoms. This work was supported in part by NSF.

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