THE MICROWAVE SPECTRA AND MOLECULAR STRUCTURES OF THE GAS-PHASE HETERODIMERS, (*E*)-1,2,3,3,3-PENTAFLUOROPROPENE-ARGON AND (*E*)-1,2,3,3,3-PENTAFLUOROPROPENE-ACETYLENE

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(*E*)-1,2,3,3,3-pentafluoropene results from the formal replacement of one of the two geminal fluorine atoms in 1,1,2-trifluoroethylene (the one located *cis* to the fluorine on the singly halogenated carbon) with a trifluoromethyl group. As determined from the analysis of the rotational spectra of the respective species, the structure of (*E*)-1,2,3,3,3-pentafluoropene-argon is consistent with the often-observed preference for maximizing the number of argon-heavy atom interactions, with argon locating away from the olefinic place and in the FC=CCF cavity, which is in many ways similar to the structure of 1,1,2-trifluoroethylene. However, the replacement of the fluorine atom with the trifluoromethyl group has a significant effect on the structure of the heterodimer with acetylene. Whereas the acetylene interacts with the geminal fluorine-carbon pair in the ethylene, when binding to the propene it does so via the cis fluorine-carbon pair.