MICROWAVE SPECTRA OF A POTENTIAL FOUR-FOLD INTERNAL ROTOR, PHENYLSULFUR PENTAFLUORIDE

JOSHUA A. SIGNORE, CHRISTOPHER FALLS, *Department of Chemistry, Wesleyan University, Middletown, CT, USA*; SUSANNA L. STEPHENS, *School of Natural and Environmental Sciences, Newcastle University, Newcastle-upon-Tyne, UK*; DANIEL A. OBENCHAIN, *FS-SMP, Deutsches Elektronen-Synchrotron (DESY), Hamburg, Germany*; CARLOS A JIMENEZ-HOYOS, *Chemistry , Wesleyan University , Middletown, CT, USA*; S. A. COOKE, *Natural and Social Science, Purchase College SUNY, Purchase, NY, USA*; STEWART E. NOVICK, *Department of Chemistry, Wesleyan University, Middletown, CT, USA*.

We present the microwave spectra of the fourth molecule containing the four-fold rotor -SF_5, phenylsulfur pentafluoride, c-C_6H_5-SF_4-F (PhSPF). The first three molecules in this series were vinylsulfur pentafluoride (VSPF), propen-1-ylsulfur pentafluoride (PSPF) and buten-1-ylsulfur pentafluoride (BSPF). VSPF exhibited splitting into the A, E, and B torsional states with 10's of MHz between the torsional transitions. PSPF exhibited the torsional splitting with 10's of kHz between transitions. BSPF exhibited no torsional splitting. Likewise, PhSPF shows no torsional splitting in the spectra. This phenomenon is mostly explained by the differences in the values of the four-fold barrier to internal rotation, V_4, in this series of molecules.