

## STRUCTURE OF COLD, MIXED PARAHYDROGEN-DEUTERIUM CLUSTERS

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Vibrational spectra of para-H<sub>2</sub> molecules in clusters consisting of para-H<sub>2</sub> or para-H<sub>2</sub>/D<sub>2</sub> seeded in He have been obtained using coherent anti-Stokes Raman spectroscopy. The Q<sub>1</sub>(0) line of para-H<sub>2</sub>, obtained upon expansion of neat para-H<sub>2</sub>/D<sub>2</sub>, exhibits a high frequency vibrational shift of about 2.6 cm<sup>-1</sup> with change of D<sub>2</sub> concentration from 0 to 98%. This shift is assigned to a decrease of the para-H<sub>2</sub> vibron band width in mixed clusters, similar to that previously observed in bulk H<sub>2</sub>/D<sub>2</sub> solid. 1% para-H<sub>2</sub>/D<sub>2</sub> clusters in He are liquid and show a much smaller shift of about 0.5 cm<sup>-1</sup> and indicate phase separation into a predominantly D<sub>2</sub> core and H<sub>2</sub> shell. The onset of phase separation in para-H<sub>2</sub>/D<sub>2</sub> mixtures is predicted at approximately 3 K providing further evidence of super-cooled liquid hydrogen clusters previously studied.