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Uniaxial stress study of the ro-vibrational transitions of HD in Si G. A. SHI, M. STAVOLA, W. B. FOWLER, E. E. CHEN, Lehigh University — The vibrational spectroscopy of interstitial H_2 in Si gave rise to a number of perplexing puzzles that concerned the rotational motion of the defect [1]. Most experiments were interpreted in terms of a static defect whereas theory suggested that there should be a very small barrier to rotation. The position and intensity of the HD vibrational line were also anomalous. The key to the solution of these puzzles was the discovery of a new vibrational line for HD and the recognition that certain ro- vibrational transitions are possible for HD that are not possible for the H_2 or D_2 homonuclear molecules in Si. H_2 in Si is a nearly free rotator after all. New experiments have been performed for HD in Si in which IR spectroscopy combined with uniaxial stress has been used to confirm the assignments of the ro-vibrational transitions of HD that underpin our understanding of H_2 in Si. This work is supported by NSF Grant DMR 0403641. 1. M. Stavola, E E. Chen, W.B. Fowler, G.A. Shi, Physica B **340-342**, 58 (2003), and references contained therein.

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