OBSERVATION OF NEW INFRARED TRANSITIONS IN SOLID PARAHYDROGEN

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In recent measurements of infrared transitions in solid parahydrogen with low ortho impurities, using an internal multireflection system[a] for a sample path length of 14 cm, we have detected new weak features in the spectral region 10 000–13 000 cm^{-1}. Of particular interest here is the second overtone band of solid hydrogen and double transitions of the type $Q_2(J')$ + $Q_1(J)$ $(J, J' = 0, 1)$ which will be presented. At 10 241.07 cm^{-1} the new single transition $W_2(0)$ could be observed.

We will also present further results of the analysis of our measurements in the first overtone region, especially a theoretical explanation of the intensities in the fine structure of the $Q_1(1)$ + $Q_1(1)$ double transition.

The absorption spectrum in the mid-infrared region (700–2 000 cm^{-1}) is currently under investigation, and new information in this region will also be presented.

[a] R. A. Steinhoff, B. P. Winnewisser and M. Winnewisser, Phys. Rev. Lett. 73, 2833-2836 (1994).