

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.

^aR. A. Steinhoff, B. P. Winnewisser and M. Winnewisser, Phys. Rev. Lett. 73, 2833-2836 (1994).