LASER SPECTROSCOPY OF 3ν, 5ν and 6ν VIBRATION - ROTATION BANDS OF HBr

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The vibration - rotation spectrum of $H^{79/81}Br$ have been studied using a GaAs semiconductor laser and a titanium sapphire ring laser in the near infrared region. The rotational fine structures up to J=15 could be detected using a 20 m absorption cell. About 100 lines have been assigned in $v = 3 \leftarrow 0$, $5 \leftarrow 0$ and $6 \leftarrow 0$ bands with a resolving power of 0.001 cm^{-1}. Spectroscopic constants have been calculated with a least-squares fitting procedure by using the spectroscopic constants of $v = 0$ reported by Lonardo and Fusina (*1*). The values in cm^{-1} are determined as below;

$G_3 - G_0 =$	7405.2618(8)	$B_3 =$	7.656220(15)	$D_3 \times 10^4 =$	3.3701(5)
	7404.1937(10)		7.653951(18)		3.3673(5)
$G_5 - G_0 =$	11887.9321(5)	$B_5 =$	7.190004(18)	$D_5 \times 10^4 =$	3.3661(10)
	11886.2940(5)		7.187967(18)		3.3640(10)
$G_6 - G_0 =$	13990.8191(10)	$B_6 =$	6.953022(45)	$D_6 \times 10^4 =$	3.3777(35)
	13988.9406(3)		6.951116(15)		3.3782(13).

The numbers given in the upper rows are those of $I^{79}Br$. The Dunham's coefficients of HBr have also been determined by a joint analysis with the constants reported by the references (*1, 2*).

(*1*) G. Di Lonardo, and L. Fusina, *J. Mol. Spectrosc.,* **148,** 86–92 (1991).
(*2*) V. Braun, and P. F. Bernath, *J. Mol. Spectrosc.,* **167,** 282–287 (1994).