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THE RADIOFREQUENCY SPECTRA OF LiF BY THE MOLECULAR BEAM ELECTRIC RESONANCE METHOD

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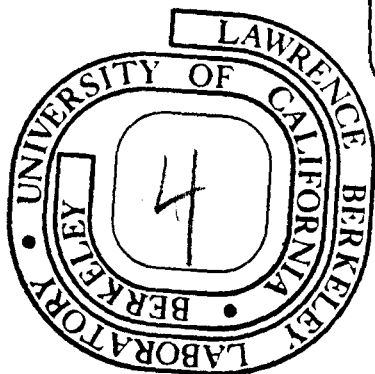
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THE RADIOFREQUENCY SPECTRA OF LiF BY
THE MOLECULAR BEAM ELECTRIC RESONANCE METHOD*

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The molecular beam electric resonance method has been used to obtain dipole moments, μ_v , lithium quadrupole interaction constants, eqQ , spin-rotation interaction constants, c_F and c_{Li} , and spin-spin interaction constants, c_3 and c_4 , for ${}^6Li^{19}F$ and ${}^7Li^{19}F$ in several of the lower vibrational levels. The observation of spectra for the three lowest vibrational states resulted in the following values.

All hyperfine constants are given in kc/sec.

${}^6Li^{19}F$:

$$\mu_v = 6.2841 + 0.08627 (v + 1/2) + 0.00054_5 (v + 1/2)^2 \pm 0.001 \text{ Debye}$$

	v=0	v=1	v=2
eqQ	8.5 \pm 0.8	8.6 \pm 1.2	7.1 \pm 2.0
c_{Li}	0.71 \pm 0.08	0.71 \pm 0.12	0.73 \pm 0.20
c_F	36.8 \pm 0.4	36.1 \pm 0.5	35.7 \pm 0.7
c_3	4.307 \pm 0.08	4.224 \pm 0.12	4.140 \pm 0.20
c_4	0.00 \pm 0.15	0.00 \pm 0.20	0.00 \pm 0.40

${}^7\text{Li}{}^{19}\text{F}$:

$$\mu_V = 6.2839 + 0.08153(v + 1/2) + 0.000445(v + 1/2)^2 \pm 0.001 \text{ Debye}$$

	v=0	v=1	v=2
eqQ	415.6 ± 0.4	406.1 ± 0.6	396.5 ± 0.8
c_{Li}	1.87 ± 0.04	1.84 ± 0.04	1.79 ± 0.04
c_{F}	32.68 ± 0.16	32.20 ± 0.22	31.84 ± 0.24
c_3	11.382 ± 0.020	11.173 ± 0.030	10.964 ± 0.030
c_4	0.00 ± 0.08	0.00 ± 0.11	0.00 ± 0.14

These results are in general agreement with those reported earlier by Wharton, Gold, and Klemperer with the exception of the spin-spin interaction constant, c_3 , for which they obtain a value of $0.21 \pm .04$ kc/sec, while our best values for the J # 1 and 2 and V = 0,1,2 levels of ${}^7\text{Li}{}^{19}\text{F}$ are all 0.0 ± 0.1 kc/sec.

¹ L. Wharton, L. P. Gold, and W. Klemperer, Phys. Rev. 133, B 270 (1964).

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