than 10^{-27} cm^2. This cross section corresponds to an upper limit to the line width for this 1.4-Mev transition of 1/100 electron volt. The line is thus exceedingly sharp and certainly quadrupole or higher.

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Structure of the ^2D Terms of the Arc Spectrum of Lithium

K. W. MEISSNER, L. G. MUNDIE,* AND P. H. STELSON
Purdue University, Lafayette, Indiana

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Interferometric wave-length measurements of high precision carried out by employing an atomic beam light source have been used for the study of several features of the arc spectrum of Li^7. Due to the great sharpness of the spectral lines produced by this source it was possible to determine the splitting of several ^2D terms. The hyperfine structure of the line 6708A was found in approximate agreement with earlier investigations. Precise wave-length measurements have been carried out relative to krypton standards. Discrepancies between the wave-lengths of this investigation and those of earlier investigators must be ascribed to lack of resolution or inadequate comparison methods employed in earlier investigations. This consideration is substantiated by our measurements carried out with a vacuum lithium arc, the results of which are consistent with the atomic beam values. Isotopic shift (Li^6 and Li^7) of the resonance line 6708A was measured.

I. INTRODUCTION

ALTHOUGH the arc spectrum of lithium has been extensively investigated, the wave-length material available contains many discrepancies and is not sufficiently accurate for reliable conclusions regarding the structure of the ^2D terms.

At first glance the measurements of Datta and Bose[1] seem to be the most reliable ones as far as average wave-lengths are concerned. These authors employed a vacuum arc and concave grating and claim an accuracy of a few thousandths A. However, the fact that with one exception they did not resolve the $^2P_{1/2,3/2}$ structure makes one doubt this accuracy.

The first observation of the fine structure of lithium lines was made by Zeeman[2] who resolved the resonance line 6708A as a doublet.

Without undertaking absolute wave-length measurements, Kent[3] carried out a detailed investigation of the doublet structure of lithium lines and their Zeeman effect. Using a quartz discharge tube as light source and a Michelson transmission echelon as resolving instrument, he succeeded in resolving the resonance line 6708A, the first two members of the sharp series (8126A and 4972A), and the first two members of the diffuse series (6103A and 4603A) as close doublets. The error involved in the measurements of the separations was one to two percent but the results are sufficiently accurate to show a definite difference between the doublet intervals obtained from the principal and sharp series and those obtained from the diffuse series. The average value of the three $^2S^2P$ combinations is 0.338 cm^{-1} and represents the $^2P_{1/2,3/2}$ splitting. The intervals observed with two pairs of the diffuse series are 0.309 cm^{-1} for 6103A and 0.328 cm^{-1} for 4603A. These separations are distinctly smaller than the $^2P_{1/2,3/2}$ splitting. Kent himself did not discuss these results since he was mainly interested in the Zeeman and Paschen-Back effect of these lines, but it is easy to see that these results are to be expected from

* Now at Naval Ordnance Laboratory, White Oak, Maryland.

[1] S. Datta and P. C. Bose, Zeits. f. Physik **97**, 321 (1935).
[2] P. Zeeman, Physik. Zeits. **14**, 405 (1913).
[3] N. A. Kent, Astrophys. J. **40**, 337 (1914).

the structure of the terms involved and that it is possible to draw conclusions about the structure of the D terms. This will be discussed in detail in Section IIIC.

The present investigation was undertaken in order to establish more precise wave-length material for confirming Kent's results and extending our knowledge to higher D terms. The small intervals involved make it necessary to employ a Perot-Fabry interferometer and a light source producing very sharp lines. As the latter we chose the atomic beam *emission* light source which in earlier investigations proved to be far superior to other existing light sources in this respect.[4a–e]

II. EXPERIMENTAL DETAILS

A. Atomic Beam Source

The atomic beam source was essentially the same as described by Mundie and Meissner.[4e] The furnace consisted of a beryllium oxide cylinder which was wound with tungsten wire in bifilar manner in order to avoid magnetic effects. A hollow steel cylinder with removable top cover was used as container for the lithium. The cover was provided with a circular opening of about 4 mm in diameter. The collimation angle of the beam could be changed between $\frac{1}{8}$ and $\frac{1}{16}$ by selecting image apertures of different sizes.

The excitation of the beam by electron bombardment was accomplished by two electron guns, the construction of which was the same as that described in the earlier investigation.

B. Spectral Apparatus

The spectrograph was a Steinheil instrument. Both the collimator and camera lenses had focal lengths of about 65 cm. Since the dispersion needed was relatively small, one flint prism was sufficient.

A *Perot-Fabry interferometer* was combined with the spectrograph in the usual way. It was inserted immediately behind the collimator lens and was mounted in an airtight chamber which was provided with a jacket through which water of constant temperature circulated. Thermostatic control secured a constancy of temperature within 0.02°C over a period of several hours.

The spectra were photographed on Eastman Kodak plates, types 103F and 103E for the visible region, type IN, hypersensitized with ammonia, for the infra-red line 8127A.

The *measurements* of the spectrograms were carried out with an Abbe comparator (Zeiss Model A, 1937).

As *standard line* for the final determination of the lithium lines the green krypton line 5570.2890A was used. The procedure of measurement was the usual one.[5] The correction for dispersion of phase change was negligible, as was seen from the agreement between wave-length values obtained with spacers of different length. The correction for air conditions was also neglected, being less than the experimental error.

TABLE I. Wave-lengths obtained with atomic beam source.

Int.*	λ I.A.		ν cm^{-1}	Combination
st	8126.452	12	302.116	$2^2P_{3/2}$—$3^2S_{1/2}$
w	8126.231	12	302.450	$2^2P_{1/2}$—$3^2S_{1/2}$
w	6707.912	14	903.662	$2^2S_{1/2}$—$2^2P_{1/2}$
st	6707.761	14	903.998	$2^2S_{1/2}$—$2^2P_{3/2}$
Sat	6103.664	16	379.077	$2^2P_{3/2}$—$3^2D_{3/2}$
st	6103.649	16	379.118	$2^2P_{3/2}$—$3^2D_{5/2}$
w	6103.538	16	379.415	$2^2P_{1/2}$—$3^2D_{3/2}$
st	4971.745	20	108.069	$2^2P_{3/2}$—$4^2S_{1/2}$
w	4971.661	20	108.408	$2^2P_{1/2}$—$4^2S_{1/2}$
st	4602.894	21	719.399	$2^2P_{3/2}$—$4^2D_{5/2}$
w	4602.826	21	719.720	$2^2P_{1/2}$—$4^2D_{3/2}$
st	4273.127	23	395.507	$2^2P_{3/2}$—$5^2S_{1/2}$
w	4273.066	23	395.841	$2^2P_{1/2}$—$5^2S_{1/2}$
st	4132.191	24	193.439	$2^2P_{3/2}$—$5^2D_{5/2}$
w	4132.135	24	193.767	$2^2P_{1/2}$—$5^2D_{3/2}$
st	3985.538	25	083.648	$2^2P_{3/2}$—$6^2S_{1/2}$
w	3985.485	25	083.981	$2^2P_{1/2}$—$6^2S_{1/2}$
st	3915.346	25	533.321	$2^2P_{3/2}$—$6^2D_{5/2}$
w	3915.295	25	533.653	$2^2P_{1/2}$—$6^2D_{3/2}$
10	6707.9174	14	903.6498	$2^2S_{1/2}{}^2$—$2^2P_{1/2}{}^{1,2}$
6	6707.9043	14	903.6789	$2^2S_{1/2}{}^1$—$2^2P_{1/2}{}^{1,2}$
20	6707.7661	14	903.9861	$2^2S_{1/2}{}^2$—$2^2P_{3/2}{}^{0,1,2,3}$
12	6707.7542	14	904.0125	$2^2S_{1/2}{}^1$—$2^2P_{3/2}{}^{0,1,2,3}$

* st = strong, w = weak component of doublet.

[4a] R. Minkowski and H. Bruck, Zeits. f. Physik. **95**, 274 (1935); [b] K. W. Meissner and K. F. Luft, Ann. d. Physik **28**, 667 (1937); Zeits. f. Physik **106**, 362 (1937); Ann. d. Physik **29**, 698 (1937); Berl. Ber. **118**, (1937); [c] R. A. Fisher, Phys. Rev. **51**, 381 (1937); [d] K. W. Meissner, Ann. d. Physik **31**, 505, 518 (1938); [e] L. G. Mundie and K. W. Meissner, Phys. Rev. **65**, 265 (1944).

[5] Details have been described by K. W. Meissner, J. Opt. Soc. Am. **31**, 405 (1941).

TABLE II. Wave-length values obtained with vacuum arc compared with those of other sources.

Int.	Vacuum arc	Atomic beam Table I	Atomic beam c.g.*	Datta and Bose	Values listed in M.I.T. tables
st	8126.452	0.452	0.378		0.52[1]
w	8126.230	0.231			
w	6707.915	0.912	0.811	0.950	0.844[2]
st	6707.768	0.761		0.728	
sat.		0.664			
st	6103.654	0.649	0.612	0.521	0.642[2]
w	6103.540	0.538			
st	4971.748	0.745	0.717	0.743	0.990
w	4971.662	0.661			
st	4602.896	0.894	0.871	0.863	0.863[3]
w	4602.829	0.826			
st	4273.128	0.127	0.107	0.070	0.28[4]
w	4273.067	0.066			
st	4132.192	0.191	0.173	0.244	0.29[4]
w	4132.140	0.135			
st	3985**	0.538	0.520	0.553	0.79[4]
w	3985**	0.485			
st	3915**	0.346	0.329	0.343	0.0[4]
w	3915**	0.295			

* Center of gravity wave-length.
** Strong bands prevented measurement.
[1] W. F. Meggers, Bull. Bur. Stand. **14**, 371 (1918).
[2] C. W. Hetzler, R. W. Boreman, and Keivin Burns, Phys. Rev. **48**, 656 (1935).
[3] S. Datta and P. C. Bose, Zeits. f. Physik **97**, 321 (1935).
[4] A. Fowler, Report on "Series in line spectra."

The *spacers* employed ranged in length from 6 mm to 66 mm. The proper size was selected in such a way as to resolve clearly the fringe patterns belonging to the different components of the doublet structure. Fortunately, a convenient property of the Perot-Fabry patterns is that with a properly selected spacer all doublets of equal interval $\Delta\nu$ can be resolved at once, regardless of their wave-length.[6] Optimum resolution of a doublet is obtained if the fringes of one component fall just midway between the fringes of the other component. In our case, all of the doublets of the sharp and diffuse series were clearly resolved with available spacers of 8, 10, and 20 mm. For higher accuracy, however, it is necessary to employ higher order numbers, i.e., spacers of greater length. To this end, a spacer of 36 mm (producing overlapping of two orders) was used for most of the lines. In the case of the line at 6103A, a spacer of 60 mm (overlapping of three orders) proved to be satisfactory.

In general, it was not possible to obtain the rather weak satellites of the *PD* combinations. It was only in the case of 6103A that we were able to separate clearly the satellite and the strong component. This required the selection of a spacer which produced a pattern in which the $2^2P_{1/2}$—$3^2P_{3/2}$ and $2^2P_{3/2}$—$3^2D_{5/2}$ lines were coincident and, the $2^2P_{3/2}$—$3^2D_{3/2}$ line fell just midway between the former lines in the pattern. Utilizing the results of preliminary measurements with 20-mm and 36-mm spacers it was easy to calculate a suitable spacer size fulfilling these conditions. A spacer of 66 mm, formed by combining a 60-mm and a 6-mm spacer, gave the desired result. The weak satellite appeared clearly between the orders of the superimposed patterns of the strong components. A spacer of this size was necessary in order to resolve the interval of only 0.015A.

The application of the same method for obtaining the satellites of the higher members of the *D* series is difficult since they are much weaker and since the ^2D splitting decreases rapidly. Therefore, no great effort was made to obtain the satellites and to measure the splitting of the higher ^2D terms directly.

III. RESULTS

A. Wave-Lengths with Atomic Beam

Table I contains the final wave-lengths and wave numbers obtained with the atomic beam source. Numerical values of estimated intensities have been omitted since they would be without any value. Only in the case of the hyperfine structure of 6708A have the theoretical intensity values of the observed components been added.

[6] Let $P=p+\epsilon$ be the order at the center of the P.F. fringes, where p is the integer order of the first bright fringe and ϵ the fraction. Then, for two lines with wave numbers ν_1, and ν_2 we have $P_1=2t\nu_1$ and $P_2=2t\nu_2$. Therefore, $\nu_2-\nu_1=(P_2-P_1)/2t=(p_2+\epsilon_2-p_1-\epsilon_1)/2t=[(p_2-p_1)+(\epsilon_2-\epsilon_1)]/2t$. Introducing the range of dispersion $\langle\Delta\nu\rangle=1/2t$ we get $\nu_2-\nu_1=\langle\Delta\nu\rangle(k+\epsilon_2-\epsilon_1)$. The integer k determines the number of overlapping orders. For constant $\nu_2-\nu_1$ the differences $\epsilon_2-\epsilon_1$ are constant, independent of wave-length.

The estimated relative intensities correspond closely to these values. The principal quantum numbers used in the last column are the theoretical ones indicating the shell of the "running" electron. The numbers on the upper right of the term symbols of 6708A are the fine quantum numbers corresponding to a nuclear moment of $\frac{3}{2}$. The wave-length values are given to the nearest thousandth of an angstrom. The experimental error is, however, generally smaller than this.

B. Measurements with Vacuum Arc

As was mentioned in the introduction, the wave-length data available in the literature concerning lithium contain serious discrepancies. In some cases the values are so uncertain that they could not be used for the determination of the correct order number of spectrograms taken with such large plate separations (36 to 60 mm) as were used with the atomic beam source. It was, therefore, necessary, to carry out an additional series of measurements using smaller spacers. Thus all ambiguity in the assignment of order numbers could be eliminated.

Since most of the wave-length values obtained with the atomic beam disagreed with those of the literature, it was decided to carry out further interferometric measurements with a vacuum arc.

The electrodes of the arc consisted of graphite cylinders of 10 mm in diameter. The anode was provided with a bore of about 5 mm in diameter and 10 mm in depth. The cavity was filled with LiCl or metallic lithium. When used on a 220-volt d.c. line with the current limited to 1.5 to 2 amperes a rather stable arc was obtained. The vacuum was maintained below 1 mm Hg. Numerous spectrograms were taken and of these the fifteen best ones selected for the final wave-length determinations. Spacers of 6 mm and 8 mm were used. The results of the different runs agreed with each other within a few thousandths of an A. Greater accuracy could not be expected since the interference fringes were rather broad due to the high temperature of this source. However, the fringes were sufficiently narrow for a clear separation of the 2^2P splitting.

The resonance line 6708A exhibited a peculiar behavior caused by strong self-reversal which made the interpretation of the interference patterns rather difficult. This difficulty was overcome by feeding the arc with sodium to which a small amount of lithium was added.

The results obtained using the vacuum arc are presented in Table II. For purposes of comparison, the wave-lengths obtained with the atomic beam and those published by other investigators have been included. The agreement between the atomic beam and the vacuum arc values is very satisfactory, the differences being within the limit of error of the vacuum arc measurements which may be estimated as ± 0.005A.

The close agreement between our vacuum arc and atomic beam values shows clearly that the discrepancies between our values and those of the other investigators must be due either to lack of resolution or to inadequate methods of comparison employed in the earlier investigations. We believe that the latter is true with the measurements given by Datta and Bose who employed a grating. Lack of resolution may be the reason for the disagreement with the interferometric measurements of Hetzler, Boreman, and Burns. Their value for 6707.844A comes very close to the average of the atomic beam values 6707.837A, a result one would expect if the patterns were overexposed. Their value 6103.642A, on the other hand, is rather close to the value of the strong component.

Since these authors used an interferometer, it is surprising that they were unable to resolve the doublet structures; they may, perhaps, have used plate separations which were not favorable for this resolution.

C. Structure of ^2D Terms

Table I, listing the results of our measurements, contains the resonance line 6708A, four members of the sharp series, and four members of the diffuse series. Only one doublet of the latter, 6103A, could be resolved completely, whereas the three others appeared only as double lines with indication of the satellite.

The splitting of the 3^2D terms can be obtained directly from the patterns of 6103A as difference of the wave numbers of satellite and strong component. The splitting of the three other members of the series can be obtained only in an indirect

TABLE III. $2^2P_{1/2}-2^2P_{3/2}$ values in cm^{-1}.

Wave-length	Atomic beam	Kent	Jackson and Kuhn
8126	0.336 ±0.001	0.340	
6708	0.3366±0.0005*	0.336	
6708	0.3360±0.0005**		0.3372 ±0.0005
4971	0.337 ±0.002	0.339	
4273	0.334 ±0.004		
3985	0.337 ±0.005		

* From patterns with unresolved hyperfine structure.
** From measurement of hyperfine structure patterns.

way. The lines of these members are the two strongest components of the 2^2P-m^2D combination ($m=4,5,6$) namely $2^2P_{1/2}-m^2D_{3/2}$ and $2^2P_{3/2}-m^2D_{5/2}$. The observed intervals ($\Delta\nu$) of these lines involve the $2^2P_{1/2,3/2}$ splitting (ΔP) as well as that of the ^2D terms (ΔD). Employing the relation $\Delta\nu=\Delta P-\Delta D$ one can find the splitting of the D terms ΔD as difference between the ΔP splitting and the measured interval $\Delta\nu$. The ΔP splitting can be found from measurements of the resonance line and members of the sharp series, where ΔP appears directly as interval of the measured doublet lines. The fact that all observed $\Delta\nu$ values of the diffuse series are smaller than the ΔP splitting reveals that all m^2D terms ($m=3,4,5,6$) of Li^7 exhibit regular term order since the 2^2P term is known to be a regular term.

Unfortunately, the lines of the sharp series are rather weak in the atomic beam source, and the strongest member ($n=3$) lies in the infra-red (8126A). Therefore, precision measurements of ΔP by employing these lines are difficult. The resonance line, on the other hand, is very strong and good interference patterns can be obtained with rather short exposure times. However, in this case the line structure is more complex since the splitting of the 2^2S term, due to the nuclear moment, is of appreciable size and gives rise to hyperfine structure. With small spacers (8 and 10 mm), the hyperfine structure was not resolved and, therefore, the $\Delta\nu$ values derived under these conditions must give values very close to the true ΔP. On the other hand, employing suitable greater separation of the interferometer plates gives complete resolution of the hyperfine structure (due to 2^2S splitting), and by employing theoretical relative intensity values of the observed component one is able to obtain the ΔP splitting with sufficient accuracy.

Both methods have been employed. The ΔP value obtained from patterns with unresolved h.f. structure agrees within the limit of error with that found by Jackson and Kuhn[7] who investigated the resonance line by means of an atomic beam in absorption. The ΔP value derived from the resolved h.f. pattern is decidedly smaller than their value. A possible explanation is given below in Section IIID.

Table III is a compilation of the $\Delta\nu$-values of the sharp series and the resonance line. For the measurement of these separations more plates were employed than for the wave-length values in Table I. Therefore, slight differences with the $\Delta\nu$ values derived from Table I may occur. The values of Table III are more reliable than those obtained from Table I. As most probable value of the ΔP splitting we accept 0.3366 ± 0.0005 cm^{-1}, a value which is in good agreement with that of Jackson and Kuhn, 0.3372 ± 0.0005 cm^{-1}.

Table IV is a compilation of the results obtained for the members of the diffuse series. The $\Delta\nu$ values presented in the third column represent the separation of the strong and weak components. The difference between $\Delta P=0.3366$ cm^{-1} and these $\Delta\nu$ values gives the splitting of the D terms and is presented in the fifth column. In the case of 6103A a direct measurement of the D splitting was possible and the value obtained directly is in agreement with that obtained by this calculation.

In principle, the presence of the weak satellite which is unresolved from the strong component, may increase the apparent $\Delta\nu$ values of this series. With the low exposure employed in the work with the atomic beam, however, it is felt that the satellite would be so greatly underexposed that the effect would not be noticeable. On the other hand, we believe that the greater values measured by Kent and by us with the relatively intense vacuum arc may be due to the action of the satellite, which with higher exposures shifts the apparent position of the strong component towards longer wave-lengths, increasing in this way the measured $\Delta\nu$. A rough

[7] D. A. Jackson and H. Kuhn, Proc. Roy, Soc. **A173**, 278 (1939).

calculation by means of the theoretical intensities of a PD combination confirms this assumption. In the case of 6103A, we obtain for the wave-length difference between the center of gravity of (strong line+satellite) and the weak component the value $\Delta\lambda=0.113$A, which is in agreement with $\Delta\lambda=0.114$A obtained with the vacuum arc and with $\Delta\lambda=0.115$A obtained by Kent.

It is seen from Table IV that the observed $\Delta\nu$ values of all observed D doublets increase regularly with m, approaching the value of the ΔP splitting. From this behavior one concludes that the ^2D terms of Li^7 are regular. The steady decrease of ΔD with m is also quite normal.

D. Hyperfine Structure of 6708A

Originally it was not intended to study the hyperfine structure of the resonance line 6708A. However, several plates taken with a spacer of 36 mm exhibited the hyperfine structure so well defined that we decided to evaluate them, inasmuch as one can also obtain the ΔP fine splitting from these patterns.

The procedure for evaluating the patterns has been described by Jackson and Kuhn[7] who made a thorough investigation of the hyperfine structure of Li 6708A. They employed the absorption method using highly collimated beams. The resolving instrument was a compound interferometer consisting of two Perot-Fabry interferometers of 5-mm and 50-mm plate separation. They derived from their measurements the following intervals:

Multiplet splitting $\Delta P_{1/2,3/2}$
$\Delta P=0.3372\pm0.0005$ cm^{-1},
Hyperfine splitting of $2^2S_{1/2}$
$\Delta\nu_1=0.0275\pm0.0003$ cm^{-1},
Hyperfine splitting of $2^2P_{1/2}$
$\Delta\nu_2=0.0015\pm0.0009$ cm^{-1}.

The respective values derived from our own measurements are $\Delta P=0.3360\pm0.0005$ cm^{-1}, $\Delta\nu_1=0.0278-0.0008$ cm^{-1} and $\Delta\nu_2=0.007-0.002$ cm^{-1}.

The values of $\Delta\nu_1$ agree rather well with each other but are not in accord with the most reliable value 0.026805 cm^{-1} found with the radiofrequency method.[8] Our value for ΔP, however, is decidedly smaller than that of Jackson and Kuhn and is also smaller than our value found from patterns obtained with smaller spacers in which the hyperfine structure was not resolved (see Section IIIC). The values of $\Delta\nu_2$ disagree completely.

TABLE IV. Observed $\Delta\nu$ values of diffuse doublets and calculated term separations $\Delta m^2D_{3/2,5/2}$ in cm^{-1}.

m	λ	Atomic beam	Kent	$\Delta m^2D_{3/2,5/2}$	Kent
3	6103	0.2996±0.0005	0.309	0.0370±0.0008 0.0374±0.0005*	0.027
4	4603	0.332 ±0.001	0.328	0.015 ±0.002	0.008
5	4132	0.327 ±0.002		0.010 ±0.003	
6	3915	0.332 ±0.003		0.005 ±0.003	

* From direct measurement of satellite and strong component.

It is difficult to find a satisfactory explanation of those discrepancies. Since the compound interferometer used by these workers eliminates overlapping orders we are inclined to assume that the deviations are due to insufficient separation of the hyperfine components on our plates. In this case the Oldenberg effect[9] can influence the values appreciably and produce a "shrinking" of the measured intervals. Employment of larger spacers or of a compound interferometer could decide this question, but we did not extend our efforts in this respect since the ΔP value is already known more accurately than the other factors ($\Delta\nu$ values of lines of the diffuse series) which are involved in the calculated values of the D-term fine structure.

E. Isotopic Shift

Several strongly exposed plates taken with a 10-mm etalon showed very clearly a weak companion line in the patterns of 6708A. The presence of this line was first mentioned in the paper of Kent[3] and has been investigated several times since.[10] According to the explanation of Schueler and Wurm, this line is the weak doublet component of the resonance line of Li^6. The values of the isotopic shift of the weak component, given in different papers, lie between 0.15 and 0.16A, which is about the value of the ΔP splitting of 6708A. This particular circumstance

[8] P. Kusch, S. Millman, and I. I. Rabi, Phys. Rev. **57**, 765 (1940).

[9] O. Oldenberg, Ann. d. Physik **67**, 253 (1922).

[10] H. Schueler and K. Wurm, Naturwiss. **15**, 971 (1927); D. S. Hughes and Carl Eckart, Phys. Rev. **36**, 694 (1930); D. A. Jackson and H. Kuhn, see reference 7.

causes a blend of the weak component of Li^7 with the strong component of Li^6. Therefore, the line complex consists of only three lines instead of the expected four ones.

A thorough investigation of the isotopic shift of lithium was carried out by Jackson and Kuhn[7] who employed a liquid air-cooled Schueler tube. They found for the shift of the weak component of Li^6 the value $\Delta\nu = -0.345$ cm^{-1} ($\Delta\lambda = +0.156$A). Furthermore, they derived in an indirect way the isotopic shift of the strong component as $\Delta\nu = -0.365$ cm^{-1} ($\Delta\lambda = +0.164$A) and arrived at the result that the multiplet separation of the isotope Li^6 equals 0.317 cm^{-1} while that of Li^7 is 0.3372 cm^{-1}.

We were able to determine the wave-length of the Li^6 line as $\lambda = 6708.072 \pm 0.001$A, whereas the wave-length of the corresponding Li^7 line, as given in Table I, is 6707.912A. From this follows the isotopic shift of the weak component $\Delta\lambda = +0.160$A($\Delta\nu = -0.356 \pm 0.002$ cm^{-1}). In principle, it is possible to find the value of the isotopic shift from the Perot-Fabry patterns of the line complex directly, as Jackson and Kuhn did, but considering the strong overexposure of the Li^7 fringes we preferred the evaluation from wave-length measurements carried out with patterns of normal exposure. Our value derived from the complex patterns is +0.159A and agrees with the first one within the limit of error.

Our value of the isotopic shift is decidedly larger than that of Jackson and Kuhn and we are not able to account for this discrepancy. On the other hand, we can confirm their result that the effective wave-length of the blend is shifted towards longer wave-lengths by +0.002A (-0.004 cm^{-1}), but we consider the accuracy of our values not sufficient for drawing conclusions regarding the doublet splitting of the two isotopes.

We plan to continue the investigation of isotopic shift in lithium by employing samples enriched in Li^6.