$^3P_2-^3F_2$ case is the first of this kind for p-p scattering as J is increased. It appeared of interest to answer the following questions: (a) are appreciable magnitudes of such coupling admitted by experiment? (b) Is there an appreciable effect of the coupling on values of phase shifts for other $J-L$ demanded by experiment?

For p-p scattering, phase shifts for all $J\leq 2$ were admitted. The s waves were as in the preceding letter. No restriction on $^3P_{0,1}$ states was made. The $^3P_2-^3F_2$ coupling was treated in resonance-theory scattering-matrix formalism,[5] all of $\delta(^3F_2)$ arising from $\delta(^3P_2)$ through the intermediate state. Fits at 240 Mev were considered typical. Values of $K(^1D_2)$ up to $\sim 4°$ were used. It was found that one needs an "uncoupled" $\delta(^3P_2)<0$ for $T=\tan^{-1}[(\Gamma_1+\Gamma_3)/(E_R-E)]>0.1$ and $T<0.3$ for $^1K_2>0$. Here the Γ_1, Γ_3 are for $L=1, 3$ and $E_R\geq 300$ Mev is the resonance energy parameter. Thus the coupling considered works somewhat against inverted order of P terms but admits such order for $T<0.1$. Fits satisfying charge independence exist in a large range of parameters and fits giving an inverted order of P levels together with charge independence have been found.

It is believed, therefore, that calculations of P waves from pseudoscalar and related potentials may need additional adjustment for intermediate-state coupling. A more complete account will be published. Thanks are due Mr. Alvin Saperstein for checking some of the analytical work.

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The Branching Ratio of K^{40}†

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ATTEMPTS to measure the branching ratio of K^{40} by determining the A^{40}/K^{40} ratio in potassium minerals of supposedly known age were recently reported by Russell, Shilibeer, Farquhar, and Mousuf[1] and by Mousuf.[2] These results indicated a branching ratio of 0.06±0.006. Other recent determinations of λ_K/λ_β by counting methods[3] and by determining the A^{40}/Ca^{40} ratio in geologically old potassium salts[4] are in agreement with a value of 0.13.

In view of this discrepancy, we have redetermined the A^{40}/K^{40} ratio in a sample of potassium feldspar which was supplied to us by Russell *et al.* This sample is listed by them as number 4.[1] Three runs were made on this material using an isotopic dilution technique. The feldspar was crushed and three samples coarser than 80 mesh were obtained. One aliquot of each of these samples was analyzed for potassium by K. Jensen and M. Sjoholm of the Argonne National Laboratory. An aliquot of this material finer than 180 mesh was also analyzed and a value of 10.43 percent K was obtained. This is 5 percent less than the amount found in the coarser fractions.

Another aliquot of each screened sample was dropped into a nickel furnace containing molten NaOH at 600°C. A known volume of A^{38} was added[5] and the reaction allowed to proceed for 24 hours. In runs 1 and 2 the tracer was added as soon as the reaction started. In run 3 the tracer was added 12 hours after the reaction began. The gases were then purified and the argon analyzed by means of a mass spectrometer with a 12-inch radius of curvature and 60° deflection. This instrument can completely resolve equal peaks separated in mass by one part in two thousand. Thus, possible hydrocarbon background peaks could be resolved from the argon. No such peaks were actually observed when the sample tube was kept at liquid air temperature.

TABLE I. Data for potassium feldspar sample No. 4, Pink Microcline, Bessner Mine, Lot 5 Con. B., Henvey Twp., Ontario.

Run	1	2	3
Sample weight (g)	14.522	27.283	6.902
Sieve size (mesh)	40–80	18–40	18–40
Percent K	11.00	10.92	10.92
A^{38}/A^{40}	$1.92\pm0.02\times10^{-3}$	$9.03\pm0.1\times10^{-4}$	$3.72\pm0.02\times10^{-3}$
A^{36}/A^{38}	0.0506 ± 0.001	0.044 ± 0.001	0.032 ± 0.001
Volume of A^{38} in tracer (cc stp)	$1.143\pm0.02\times10^{-5}$	$0.997\pm0.02\times10^{-5}$	$1.063\pm0.02\times10^{-5}$
Radiogenic A^{40} (cc stp) per g	$4.01\pm0.12\times10^{-4}$	$4.03\pm0.12\times10^{-4}$	$3.99\pm0.12\times10^{-4}$
A^{40}/K^{40}	0.0534 ± 0.0014	0.0541 ± 0.0014	0.0536 ± 0.0014

The data obtained are listed in Table I along with the sample weights. The A^{38}/A^{40} ratio in the tracer is 0.54±0.01. The error given for the A^{40}/K^{40} ratio is the square root of the sum of the squares of the individual mean deviations and estimated errors.

The amount of atmospheric contamination is determined from the A^{36}/A^{38} ratio and is less than 3.3 percent in all runs. It is seen that the results of the three runs agree within two percent.

A sample of Opal glass and potassium feldspar obtained from the Bureau of Standards was analyzed along with an aliquot of feldspar used in run No. 2. The results obtained with the two standards agree with the values listed by the National Bureau of Standards[6] within one percent.

The value of A^{40}/K^{40} given by Russell *et al.* is 0.037±0.004. The values which we have obtained is 0.0537±0.0014. We have obtained 75 percent greater yields of radiogenic argon per gram of sample than they report and the potassium content which we have determined is greater than theirs by 17 percent.

Using a value of 0.54×10^{-9} year^{-1} for the decay constant and 0.060 for the branching ratio, we obtain an age of 12.6×10^8 years. The age which was assumed by Russell *et al.* was 9.4×10^8 years. This age was determined from the Pb^{206}/Pb^{207} ratio in a sample of uraninite from the same locality as the feldspar. The A^{40}/K^{40} age calculated for this feldspar, assuming our A^{40}/K^{40} ratio and a branching ratio of 0.13 is 7.0×10^8 years. Chemical analysis of this uraninite gave 5.57 percent lead and 52.76 percent uranium.[7] Using the isotopic analyses of Russell *et al.* and computing the contamination from Nier's values on the Bear Lake galena,[8] we obtain a Pb^{206}/U^{238} age of 6.9×10^8 years and a Pb^{207}/U^{235} age of 7.6×10^8 years. Nier[8] determined the lead-uranium and lead-thorium ages of a sample of Bessner uraninite. He obtained a Pb^{206}/U^{238} age of 7.65×10^8 years, a Pb^{207}/Pb^{206} age of 8.25×10^8 years, and a ThD/Th age of 7.87×10^8 years.

Considering the uncertainty in the age assigned to this locality, we feel that our results are essentially in agreement with a branching ratio of 0.13.

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