field with distance is presumably slow, it does not seem that Bailey's theory can account for the observed phenomenon.

It is hoped to publish elsewhere a detailed criticism of Bailey's theory, with particular attention to the physical aspects, together with an alternative explanation for the excess noise from sunspots.

[1] V. A. Bailey, Phys. Rev. **78**, 428 (1950).
[2] In the magneto-ionic theory ordinary waves have a sense of rotation of polarization opposite to that of a free electron under the action of the axial magnetic field while the reverse is true for the extraordinary waves.

Search for Be^7 States Using the Li^6 Technique*

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In Be^7, the mirrored counterpart of the single 480-kev excited state in Li^7 is now well established at 429±15 kev by two independent methods.[1] However, two additional levels in Be^7 have been reported[2] in spectrum studies on neutrons from LiCl and LiF bombarded with 5.1-Mev (cyclotron) protons. Subsequently others[3] using similar techniques at lower proton energies have not found such levels. We have used the improved neutron energy resolution of the Li^6 technique[4] to measure $Li^7(p,n)Be^7$ neutron spectra in an extended search for any additional levels in Be^7. The possibility[2] of a proton energy threshold for excitation of these additional levels led us to extend E_p nearly 0.5 Mev above the maximum Van de Graaff beam energy previously employed.

The proton beam from the Berkeley electrostatic generator was deflected through a stationary 90°-analyzing magnet into a double slit system defining E_p to ±15 kev. A spectroscopically pure lithium target was used to eliminate extraneous (p,n) reactions from the negative radical of any Li compound. Metallic Li was evaporated onto a thin copper backing disk and transferred in an argon atmosphere to the target chamber. Target thickness measured less than 30 kev for all E_p. An oil-vapor trap was used to prevent carbon deposits on the target. Li^6 plates in Cd containers were mounted tangentially to neutron direction at radial angles $\eta=0$, 30, and 90° to the proton beam. Exposures were monitored by proton collection on the insulated target with a conventional current integrator to measure the charge. Exposed plates were faded, processed[5] and examined under 90× oil-immersion objectives and 8× oculars fitted with AO-1407 reticules. The sum of alpha- and triton ranges was measured to the nearest RU (Fig. 1); an eyepiece goniometer gave laboratory angles, ϕ, between neutron and triton, to the nearest degree. Details of data selection and analysis using the Li^6 technique for collimated and/or isotropic neutrons are available.[4,5]

Two separate runs were made at each $E_p=3.00$, 3.60, and 4.35 Mev. Approximately 10,000 disintegrations have been measured. Figure 1 shows measured histograms for $\eta=0°$. From mean energies of the resolved neutron groups in nine different spectra an average value of 433±26 kev for the level excitation energy in Be^7 is obtained. It is noteworthy that this level was definitely excited even for the lowest $E_p=3.00$ Mev. Though some of the data suggest a level intermediate between 433 kev and the ground state, no single group corresponding to such a level was considered sufficiently resolved or sufficiently intense to be so identified with certainty. Spectra were corrected for the energy dependence of the geometrical selection criteria[5] but not for $\sigma_c(Li^6)$, since this is not established for $E_n>0.6$ Mev. Preliminary evidence[5] indicates a broad resonance near 2 Mev and probable $1/E$ flatness elsewhere. Applying this tentative σ-correction, no additional group is observed with more than 15 percent of ground-state intensity. In regions of large $d\sigma/dE_n$ (e.g., near 2 Mev) clearly there has been slight shifting and considerable spreading of the observed peaks. Most accurate comparison of relative group intensities and widths must await precison measurements, now underway, of $\sigma_c(Li^6)$ for $E_n>0.6$ Mev.

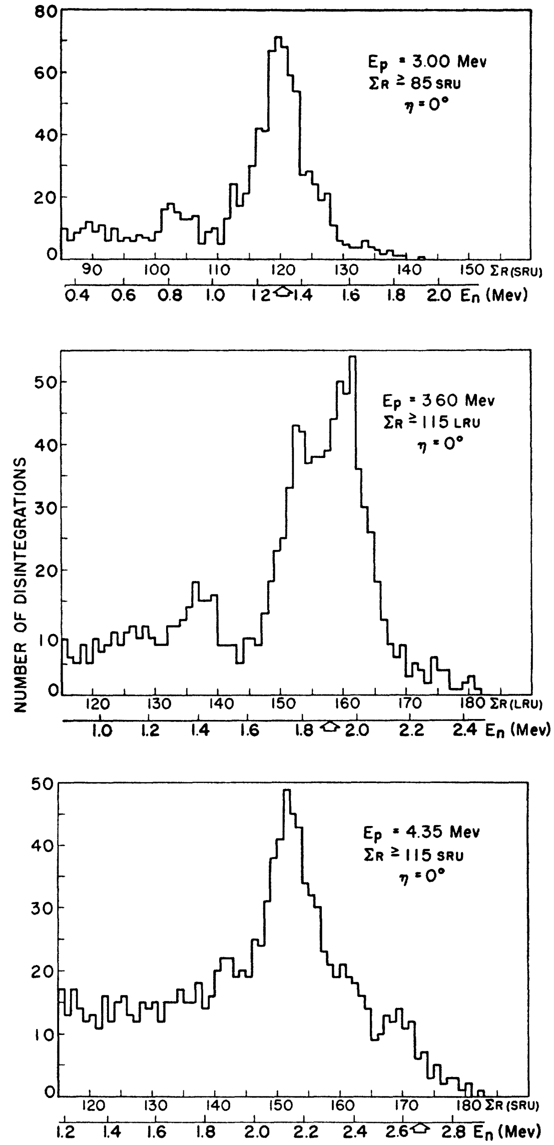

Fig. 1. $Li^7(p,n)Be^7$ neutron spectra (uncorrected for σ_{Li^6}) observed at 0° to the proton beam. Arrow indicates ground-state energy as calculated from E_p, η, and $Q=-1.63$ Mev. One $LRU=0.60\mu$; one $SRU=0.70\mu$.

Possible sources of error are considered in detail in the complete report of this work, UCRL-924; extraneous (p,n) reactions in the target assembly are shown to be negligible at these values of E_p, while any (n,p) reactions in the emulsion are readily distinguished from Li^6 disintegrations by track length or grain density variation. Li^6 monitor plates exposed near the target assembly indicated a less than one percent neutron background for all E_n.

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