

A CONTRIBUTION TO THE STUDY OF HYPERNUCLEI

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In a previous work⁽¹⁾ an analysis was made of mesonic hypernuclei (MHN) with $Z > 2$ produced by interaction of K^- mesons at rest (RK^-) with emulsion nuclei. It has been found that among 315338 K^- interactions ($K^- \sigma$) there are about 2109 MHN (long MHN tracks have not been systematically followed). Events without a hypernucleus have also been found, but one of the fragments of interaction products originated from a hammer-like event (H). (It belonged to the ${}^8\text{He}$, ${}^8\text{Li}$, ${}^9\text{Li}$ or ${}^8\text{B}$ nucleus). An investigation of the nature of the incident particles has shown that the events are due not only to K^- interactions at rest (RK^-) and in flight (FK^-) (see Table I).

Table I

Primary star	RK^-	FK^-	$R\pi^-$	$R\Sigma^-$	unknown	total
N	498	19	123	13	19	673

On the basis of this it was possible to complete Gerber's table on the probability of occurrence of hammer-like events as a function of energy. For RK^- interactions with emulsion nuclei it amounts to 0.19%.

Neither hyperons, nor hypernuclei can be produced by the absorption of π^- -mesons, i.e. of $R\pi^-$. Therefore the hammer-like event among fragments of $R\pi^-$ absorption in which no β -particle is emitted shows electron loss in recording hammer-like events under our experimental conditions. In $R\pi^-$ absorption this loss occurs in 3.5% of cases, whereas in RK^- absorption it amounts to 8.5%. Hence it is concluded that about 5% of cases of hammer-like events without electrons in K^- absorption are associated with a MHN with the emission of a π^0 -meson.

A comparison of the ranges of the ${}^8_{\Lambda}\text{Li}$, ${}^8_{\Lambda}\text{Be}$, and ${}^{12}_{\Lambda}\text{B}$ hyperfragments⁽³⁾ with those of hammer-like fragments from the RK^- interaction in emulsion ($R_{\mu.m}$) shows that among the hammer-like events there are a considerable fraction of those belonging to heavier nuclei, i.e. to the ${}^8_{\Lambda}\text{B}$ hypernucleus.

References

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- (2) J.P.Gerber et al., Nucl.Phys. B 5, 75 (1968)
- (3) D.Kielczewska et al., Université libre de Bruxelles, ULV-VUB IIHE-76.3