Mass production of the large-sized nuclear plate for J-PARC E07

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The main purposes in our research are to analyze generation of ΛΛ hyper nucleus containing two Λ particles, and decay of those particles, and to clarify the interaction of Λ-Λ. In order to analyze an interaction, it is very difficult to make another particles collide with Λ particles only with the life for 10^{-10} seconds. We generate a nucleus with two Λ particles by making a nucleus absorb Xi^- particles.

Generation and the decay process of ΛΛ hyper nucleus are detected into the photographic plate called a nuclear plate. We aim at plate the number of ΛΛ hyper-nucleus detection of 10 times or more of E373 in the J-PARC E07 [1]. Therefore, large-sized plate is needed. These production was performed by ourselves in Gifu University. Production of the plate which attains to 1500 totals over a year half was completed since 2014 December. A production schedule is shown in Table. 1.

Table1. Production cycle

1st day	1st pouring	
2nd day		1st pouring
3rd day	Surface coat	
4th day		Surface coat
5th day	2nd pouring	
6th day		2nd pouring
7th day	Surface coat	
8th day		Surface coat
9th day	Final dry	
10th day	cutting	

The nuclear plate is made from using an emulsion as a dry film. Emulsion makes gelatin the main ingredients and distributes the silver halide crystals of an abbreviation 0.2 μm. Emulsion melted in the shape of gel is poured to a polystyrene film in the size of 710×700mm^2. It dries slowly between two days of dry shelves, and makes it dry prate so that distortion may not produce this. After dryness surface coat is performed to prevent a deposit of surface silver. After doing the same work also on the back, final dry, and it cuts .(710×700 mm^2 → 350×345 mm^2) Before beam irradiation, there is kept in the Kamioka mine, in order to suppress the influence of a β ray and a γ ray.

References

[1] k.Imai et al.,[http://j-parc.jp/researcher/Hadron/en/pac_0606/pdf/p07-Nakazawa.pdf]