

LETTER OF INTEREST

HYPERNUCLEAR PHYSICS AT DAΦNE

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We express the interest in performing at DAΦNE an experiment on Λ -hypernuclei production, starting from the beginning of the operation of the machine. The experiment will use a high resolution (200 KeV) magnetic spectrometer, having a $\sim 2\pi$ angular acceptance. The magnetic spectrometer will be composed by a solenoid ($\sim L=2\text{m}$, $\phi=2\text{m}$, $B \cong 1+1.3\text{ T}$) with thin drift chambers for the tracking of the particles. More details on the physics case and the experimental approach can be found in Ref. [1], [2] and [3]. The experiment may provide good physics results at $L = 10^{32}\text{ cm}^{-2}\text{s}^{-1}$; test on already known targets may be performed even at a few $10^{31}\text{ cm}^{-2}\text{s}^{-1}$, for the setting-up of the apparatus.

The idea of using the K^- at DAΦNE for hypernuclear physics was put forward in 1990 at the INFN Directorate by T. Bressani, and was further discussed at the Folgaria School (February '91) and at the DAΦNE Workshop (April '91). In this occasion strong interest for participating to the experiment was expressed by groups from INS (Tokyo) and Dubna. Further interest in participation was expressed in July '91, during the NAN Workshop in ITEP (Moscow), by groups from Czechoslovakia (Bratislava and Prague).

A preliminary request of financial support to the experiment was put forward at the Nuclear Physics Committee (Gr. III) of INFN in July '91, for prototype studies. It was satisfied ($\sim 80\text{ ML}$).

During Fall '91 simulations of the apparatus, based on GEANT 3 package, were started and the results till now obtained are very encouraging³. Discussions with the Pisa Group (M. Giorgi) were started in November '91, in order to see whether a possible combination of

efforts between the Argon Liquid calorimeter collaboration and the high resolution spectrometer collaboration were possible. At moment, a sinergy at a second stage, for exploiting (K_{stop}^-, π^0) reactions for hypernuclear physics, never performed before, seems very useful. It seems very hard (magnet !) to combine in a unique apparatus the (K_{stop}^-, π^-) and the Liquid Argon experiments.

The ideas concerning the physics and the apparatus were presented at the International Symposium on Hypernuclear and Strange Particle Physics, held in Shimoda (Japan) from 9 to 12 December 1991, and at the Comité d'Expériences in Saclay the 17 December 1991. Interest in participating to the experiment was manifested by groups of KAON (Vancouver) and Yerevan (Armenia). Also other Italian groups (Bari and Trieste) expressed their wish to join the collaboration.

At present, we envisage to prepare a small Workshop on Hypernuclear and Low Energy Kaon Physics at DAΦNE in March 1992, in order to settle the collaboration and, probably, to formalize our interest in a Letter of Intent. In the meantime, activity on simulations and prototyping will continue.

- 1) T. Bressani, in *Proc. Winter School on Hadronic Physics* (Word Scientific), in press.
- 2) T. Bressani, in *Proc. of the Workshop on Physics and Detectors for DAΦNE* (ed. G. Pancheri, Frascati, 1991), p. 475.
- 3) G.C. Bonazzola et al., accepted for publication by Nucl. Phys. A