RCNP EXPERIMENT E226

PROPOSAL FOR EXPERIMENT AT RCNP

22-July-2003

TITLE: Spallation UCN production in 0.5 K He-II

SPOKESPERSONS:

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EXPERIMENTAL GROUP:

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Robert Golub	Hahn Meitner Institute	(Laboratory Fellow)
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RUNNING TIME:

Installation time without beam	2 months
UCN production by proton beam	15 days

BEAM LINE:

Ring : ES course

BEAM REQUIREMENTS:

Type of particle:	p
Beam energy	400 MeV
Beam intensity:	as high as possible

BUDGET:

see page 12, V. Experimental cost

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SUMMARY OF THE PROPOSAL

We produced for the first time spallation ultra cold neutrons (UCN) in super fluid helium (He-II) in 2002. The UCN density was about 0.7 UCN/cm^3 in an experimental region at a proton power of 78 W and a He-II temperature of 1.2 K. We will apply the new UCN source to various UCN experiments. It is very useful to understand the fundamental behavior of the new UCN source in the application. For example, at lower He-II temperature, higher UCN density is expected because of longer UCN storage time and lower UCN loss during diffusion from the UCN production volume to the experimental volume. In the present experiment, we will measure the UCN density and diffusion loss in a He-II temperature region from 2 to 0.5 K for the confirmation of the expectation. We will measure the UCN storage time in a bottle of new material for the improvement of the UCN density.

The contents of the present proposal are