

UNIVERSITY OF NOTRE DAME  
DEPARTMENT OF PHYSICS

# SPECIAL NUCLEAR SEMINAR

Friday, May 11

## *Direct measurement of the ${}^7\text{Be}(n,\alpha){}^4\text{He}$ reaction cross sections for the cosmological Li problem, and recent activities in Kyoto University*

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The cosmological Li problem has been of great interest in recent years. The primordial  ${}^7\text{Li}$  abundance estimated from observations is three times smaller than any theoretical calculations.

From a view of nuclear physics, nuclear-reaction rates involved in the Big Bang nucleosynthesis (BBN) should be examined. It was pointed out that the  ${}^7\text{Li}$  abundance will be greatly reduced in the BBN calculation if the destruction rate of  ${}^7\text{Be}$  is enhanced. One of the candidate channels to destruct  ${}^7\text{Be}$  is the  ${}^7\text{Be}(n,\alpha){}^4\text{He}$  reaction. Unfortunately, the cross section for the  ${}^7\text{Be}(n,\alpha){}^4\text{He}$  reaction at the cosmological energy has been scarcely measured.

Recently, we have measured the cross section for the  ${}^4\text{He}(\alpha,n){}^7\text{Be}$  reaction, which is the time reverse reaction of the  ${}^7\text{Be}(n,\alpha){}^4\text{He}$  reaction, and determined the cross section for the  ${}^7\text{Be}(n,\alpha){}^4\text{He}$  reaction at low energies down to  $E_{\text{c.m.}} = 0.20$  MeV for the first time. The experimental details and results will be reported.

We will also review the recent activities in Kyoto University. A search for rare gamma-decay modes in  ${}^{12}\text{C}$  to examine the triple reaction rate at high temperature and a development of the MAIKO active target for missing-mass spectroscopy of unstable nuclei under the inverse kinematic conditions will be reported.

**2 pm – 3 pm**

**Nuclear  
Science  
Laboratory**

**124 Nieuwland  
Science Hall**

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All interested  
persons are  
cordially invited  
to attend

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Refreshments will be  
served prior to the  
seminar in room 124