国立研究開発法人理化学研究所　仁科加速器研究センター
第251回 RIBF核物理セミナー
RIKEN Nishina Center for Accelerator Based Science
The 251st RIBF Nuclear Physics Seminar

Direct measurement of the ^{7}Be(n,α)^{4}He reaction cross sections for the cosmological Li problem

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Big Bang nucleosynthesis (BBN) theory predicts the abundances of the light elements produced in the early universe. The calculated primordial abundances of the helium and deuterium are in good agreement with those inferred from observations. However, there remains a serious problem: the ^{7}Li abundance does not agree with any theoretical BBN calculations. This discrepancy is known as the cosmological lithium problem, and has been of great interest in recent years.

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

Recently, we have measured the cross section for the ^{4}He(α,n)^{7}Be reaction, which is the time reverse reaction of the ^{7}Be(n,α)^{4}He reaction, and determined the cross section for the ^{7}Be(n,α)^{4}He reaction at low energies down to $E_{c.m.}$ = 0.20 MeV for the first time. We will report the experimental details and derived thermonuclear reaction rate of the reaction of interest in the present seminar.

＊ The talk will be given in English language.

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