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The neutron-antineutron oscillation and low-energy antinucleon-nucleon Interactions [Remote talk]

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The neutron-antineutron oscillation violates the baryon number conservation and is of great importance in the context of testing the Grand Unified Theories and understanding the origin of the baryon asymmetry of the universe [1]. Currently, the oscillation time is constrained to be $> 0.86 \times 10^8$ s for free neutrons and $> 2.7 \times 10^8$ s for bound neutrons [2,3]. In view of future experiments to improve the limit with free neutrons, there have been recent proposals that require the knowledge of the nuclear potentials experienced by low-energy antineutrons [4,5].

In this context, there is a renewed interest in the antinucleon-nucleus interaction. The data currently available are mainly from antiprotonic atom spectroscopy and antinucleon-nucleus scattering/annihilation cross-section measurements at the time of LEAR. Although optical potential models have been developed which well describe the s-wave scattering lengths of antiprotons with nuclei, it has been pointed out that there is a serious discrepancy between the theoretical model and the experimental data [6].

In this presentation, the above topics are reviewed, and experiments that can potentially be conducted in this context will be discussed.

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