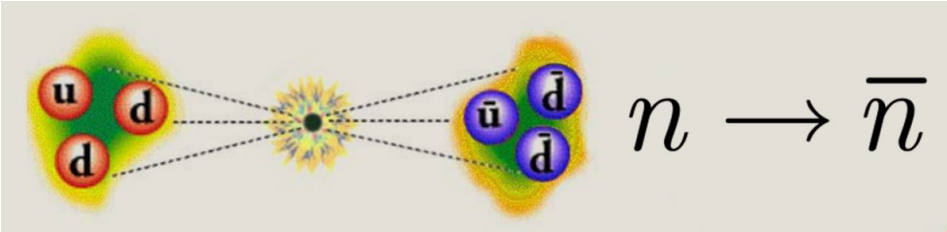

Contribution ID: **1** Type: **Oral Presentation**

Overview of some recent theoretical developments in neutron oscillation

Monday, 3 August 2020 10:00 (30 minutes)

There are a number of puzzles of beyond the standard model physics that can be probed directly by the process of neutron-anti-neutron oscillation in contrast with the othetr popular baryon violating process i.e. the typical GUT motivated proton decay mode $p \to e^{+0}$. The most important of them is a direct understanding of the baryon asymmetry of the universe on which the typical GUT motivated baryon violation cannot. Also if neutron oscillation is observable, leptogenesis mechanism also does not work. The mechanism for such baryogenesis is the post sphaleron model which implemented in the context of $SU(2)_L \times SU(2)_R \times SU(4)_C$ model for neutron oscillation leads to an upper limit on neutron-antineutron oscillation time within the reach of currently proposed experiments. Furthermore, if neutrino-less double beta decay fails to yield a positive signal, an alternative way to establish that lepton number is violated and neutrinos are their own antiparticles is to discover both proton decay and neutron oscillations. Also the belief that neutrinos are likely to be Majorana fermions strongly suggests that there may be a small Majorana component to the neutron mass which leads to neutron oscillation. All these arguments provide strong arguments for a new search for neutron-anti-neutron oscillation. In the second part of the talk, I point out some constraints arising from big bang nucleosynthesis that suppress the neutron mirror neutron oscillation which is under study in several experiments.

Contribution Title

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