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How large could CP violation in B meson mixing be? Implications for baryogenesis and upcoming searches

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It is well-known that CP violation is one of the necessary ingredients to generate the observed matter-antimatter asymmetry of the Universe. Neutral B mesons naturally exhibit CP violating oscillations which can be related to the baryon asymmetry through the B-Mesogenesis mechanism. With this in mind, it is interesting to analyze how large this CP violation could be in different scenarios beyond the Standard Model. In this talk, I will consider (i) the effects of heavy new physics in mass mixing following a model-independent approach, (ii) the implications of models going beyond 3x3 CKM unitarity (including, e.g., vector-like quarks), and (iii) the effects of new contributions to the B meson decay mixing. I will present the available parameter space for the relevant CP asymmetries, studying their compatibility with the B-Mesogenesis framework and compare it with the expected experimental sensitivity at LHCb and Belle II.

Abstract

It is well-known that CP violation is one of the necessary ingredients to generate the observed matter-antimatter asymmetry of the Universe. Neutral B mesons naturally exhibit CP violating oscillations which can be related to the baryon asymmetry through the B-Mesogenesis mechanism. With this in mind, it is interesting to analyze how large this CP violation could be in different scenarios beyond the Standard Model. In this talk, I will consider (i) the effects of heavy new physics in mass mixing following a model-independent approach, (ii) the implications of models going beyond 3x3 CKM unitarity (including, e.g., vector-like quarks), and (iii) the effects of new contributions to the B meson decay mixing. I will present the available parameter space for the relevant CP asymmetries, studying their compatibility with the B-Mesogenesis framework and compare it with the expected experimental sensitivity at LHCb and Belle II.

Primary author(s) : MIRÓ ARENAS, Carlos (IFIC (CSIC - U. Valencia))

Presenter(s) : MIRÓ ARENAS, Carlos (IFIC (CSIC - U. Valencia))

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