

Abstract Submitted
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Fractional dynamics as source of CP violation in the Standard Model ERVIN GOLDFAIN, OptiSolve Consulting — The origin of CP violation in K-meson channels and the strong CP problem are long-standing puzzles of the Standard Model. Building on our recent contributions^{1),2)} we find that breaking of CP symmetry is a direct manifestation of fractional dynamics and non-equilibrium phenomena in particle physics. Our results are summarized below:

$$\begin{aligned} |\varepsilon_K|_{EXP} &= (2.280 \pm 0.013) \times 10^{-3}, & |\varepsilon_K|_{THEOR} &= 2.162 \times 10^{-3} \\ |\varepsilon_K'|_{EXP} &= (3.878 \pm 0.16) \times 10^{-6}, & |\varepsilon_K'|_{THEOR} &= 4.670 \times 10^{-6} \\ (\theta_{QCD})_{EXP} &< 10^{-10}, & (\theta_{QCD})_{THEOR} &< 3.491 \times 10^{-10} \end{aligned}$$

Here, $|\varepsilon_K|$, $|\varepsilon_K'|$ are the two CP parameters describing the K-meson sector and θ_{QCD} the CP term associated with the vacuum structure of Quantum Chromodynamics. 1) E. Goldfain, Communications in Nonlinear Science and Numerical Simulation, Volume 13, Issue 3, June 2008, Pages 666-676 2) E. Goldfain, Communications in Nonlinear Science and Numerical Simulation, Volume 13, Issue 7, September 2008, Pages 1397-1404

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