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Electroweak baryogenesis from charged current anomalies in B meson decays

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We demonstrate for the first time that new physics explaining the long standing charged B meson anomalies, $R(D^{(*)})$, can be the source of CP violation that explains the observed baryon asymmetry of the universe (BAU). We consider the general two Higgs doublet model with complex Yukawa couplings and compute the BAU in the semiclassical formalism, using a novel analytic approximation for the latter. After imposing constraints from both flavor observables and the electron electric dipole moment (eEDM), we find that a significant BAU can still be generated for a variety of benchmark points in the parameter space, assuming the occurrence of a sufficiently strong first order electroweak phase transition. These scenarios, which explain both the $R(D^{(*)})$ flavor anomalies and the BAU, can be probed with future eEDM experiments and Higgs factories measurements.

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