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Sources of CP Violation for Electroweak Baryogenesis (17'+3')

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A persistent issue in electroweak baryogenesis calculations is the significant disparity in predictions yielded by different approaches, with variations spanning several orders of magnitude. In this study, we examine a system comprising two fermion flavours, proposing the existence of two sources of CP-violating. The semi-classical force and a new resonantly enhanced mixing source can be derived from the collisionless Kadanoff-Baym equation. The two sources are derived using the semiclassical approximation and the VEV insertion approximation. A Higgsino-Bino toy model shows that the new resonantly enhanced mixing source generates sufficient asymmetry to evade EDM bounds. In addition, a ready-to-plug equation for the source is prepared so phenomenologist can use it in their favourite model.

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