

Transport equations for electroweak baryogenesis

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An integral part of the BSM physics model building is testing if the new models can provide the answer to the origin of the baryon asymmetry in the universe (BAU). This test requires solving the CP-violating out-of-equilibrium particle distributions near the expanding phase transition front. The quantum transport theory for this purpose, the semiclassical method, is well understood and applicable in the limit of reasonably wide walls. The SC-equations are usually solved in the diffusion equation limit or in the moment expansion approximation, relying on the two lowest moments of, essentially the perpendicular particle velocity to the wall front. Here I will present a generalisation of the moment expansion approach to an arbitrary number of moments N and show that the result for BAU converges, albeit rather slowly, as a function of N . I will also make a comment on the historical development of the transport equations for the EWBG, including the competing VIA-method, and outline further developments in quantum regime beyond the SC-method.

Primary author: KAINULAINEN, Kimmo Juhani (University of Jyväskylä (FI))

Co-author: Ms VENKATESAN, Niyati (University of Jyväskylä)

Presenter: KAINULAINEN, Kimmo Juhani (University of Jyväskylä (FI))

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