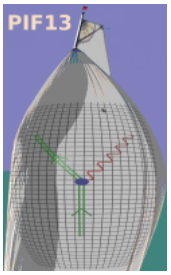

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Pre-acceleration from Landau-Lifshitz Series

Thursday, 11 July 2013 12:20 (20 minutes)

The Landau-Lifshitz equation is considered as an approximation of the Abraham-Lorentz-Dirac equation. The former is derived from the latter by treating radiation reaction terms as a perturbation. However, while the Abraham-Lorentz-Dirac equation has pathological solutions of pre-acceleration and runaway, the Landau-Lifshitz equation and its finite higher order extensions are free of these problems. So it seems mysterious that the property of solutions of these two equations is so different. We show that the problems of pre-acceleration and runaway appear when one consider a series of all-order perturbation which we call it the Landau-Lifshitz series. The Landau-Lifshitz series diverges in general. Hence a resummation is necessary to obtain a well-defined solution from the Landau-Lifshitz series. This resummation leads the pre-accelerating and the run-away solutions.

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