

Geometry of rotating discs in Einstein-Maxwell theory and the Ehrenfest paradox

Wednesday, 30 March 2022 09:00 (30 minutes)

In 1909 Ehrenfest formulated a famous paradox concerning a rigidly rotating disc (or cylinder originally) within special relativity. It caused a lot of debate and there is no general agreement on its solution. Directly related to the paradox is the question of spatial geometry of rotating discs.

In this talk, I will discuss the charged rotating disc of dust which is a concrete, physically relevant solution of the Einstein-Maxwell equations in terms of a post-Newtonian expansion.

Based on the solution, the spatial geometry of the disc will be examined and a comparison to a standard disc within special relativity (described by Grøn) will be drawn in the Newtonian limit. Furthermore, I will show that new, interesting effects appear near the ultra-relativistic limit and for non-vanishing charge.

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