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Quantisation Across Bubble Walls and Friction

Monday 22 April 2024 15:03 (3 minutes)

We employ first principles to quantize field theories living on a bubble wall background in the planar limit, focusing on spontaneous gauge symmetry breaking. Utilizing these principles, we compute the average momentum transfer resulting from transition radiation—soft emissions during the traversal of an energetic particle across the wall, particularly focusing on longitudinal polarization. Our findings reveal comparability between longitudinal and transverse polarizations in symmetry-breaking transitions with mild super-cooling, with the former dominating in broken-to-broken transitions with thin walls. Our results bear phenomenological implications for bubble expansion during first-order phase transitions. Our versatile framework facilitates the computation of diverse particle processes in translation-breaking backgrounds. If time permits some concrete applications (e.g. emission of NGBs, symmetry restoring PT, ...) will be presented.

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