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Canonical Quantization and Lorentz Symmetry for the LC Gauge in QED

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The LC gauge condition A_0-A_3=0 is considered within the canonical quantization procedure with different temporal parameters: x^0, x^+ and x^-, respectively. Though this gauge condition is Lorentz noncovariant, the symmetry for the Lorentz boost along the x^3 axis remains unbroken. This longitudinal boost plays a crucial role for the modified quantization procedure at the hypersurface x^{+}=0, where the standard Dirac procedure for constrained systems fails. The Feynman propagators with chronological ordering in x^0, x^+ and x^-, respectively, contain the Mandelstam-Leibbrandt prescription for the noncovariant pole.

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