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Interpolating Quantum Electrodynamics

The instant form and the front form of relativistic dynamics proposed by Dirac in 1949 can be linked by introducing an interpolating angle. Entwining the fermion propagator interpolation with our previous works of the interpolating helicity spinors[1] and the electromagnetic gauge field interpolation[2], we now complete the interpolation between these two forms of quantum electrodynamics (QED). We exemplify the characteristic difference of the fermion propagator between the instant form dynamics (IFD) and the front form dynamics, or the light-front dynamics (LFD), presenting the whole landscape of both the Compton scattering amplitudes and the two-photon production amplitudes in the pair annihilation of fermion and anti-fermion process which show the frame dependence as well as the interpolating angle dependence.

References:
[1] Z.Li, M.An and C.-R.Ji, "Interpolating Helicity Spinors Between the Instant Form and the Light-front Form," Phys.\ Rev.\ D {\bf 92}, no. 10, 105014 (2015)[arXiv:1509.00431 [hep-th]].

[2] C.-R.Ji, Z.Li and A.T.Suzuki,"Electromagnetic gauge field interpolation between the instant form and the front form of the Hamiltonian dynamics,"
Phys.\ Rev.\ D {\bf 91}, no. 6, 065020 (2015)[arXiv:1412.2726 [hep-th]].

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