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Fermion Propagators Interpolating between the Instant and Front Forms of Relativistic Dynamics BAILING MA, CHUENG-RYONG JI, North Carolina State Univ — The instant form and the front form of dynamics originally proposed by Dirac in 1949 can be linked by introducing an interpolating angle. In the present work, we discuss the fermion propagator interpolating between the Instant Form Dynamics (IFD) and the Light Front Dynamics (LFD). Using a simple example, which is the scattering of a scalar particle with a fermion, we trace the fates of the time-ordered fermion propagators as the form of the dynamics goes from the IFD to the LFD. With our interpolation method, we show that the two time-ordered propagators corresponding to the positive and negative energy contributions in IFD change to the on-shell and instantaneous contributions in LFD, respectively. We also present the interpolating helicity amplitudes for the scattering of photon and fermion, i.e. the Compton Scattering, as well as for the two-photon production process in the pair annihilation of fermion and anti-fermion. We discuss the whole landscape of each of these amplitudes and amplitude squares that show the frame dependence as well as the interpolating angle dependence.

Chueng-Ryong Ji
North Carolina State Univ

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