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Positronium on the Light-front

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Basis Light-front Quantization (BLFQ) is a newly developed nonperturbative approach, aiming for solving relativistic bound systems based on the Hamiltonian formalism of the lightfront dynamics. In this work, we introduce its application to the positronium system with a dynamical photon mediating the interaction between the positron and the electron. we show the nonperturbative Hamiltonian renormalization procedure we use to cancel the fermion self-energy effect. we present results of the numerical calculation such as the mass spectrum, the wave function and the distribution of the photon inside the positronium. we also illustrate how these quantities depend on the regulators of the theory. Finally, we introduce the next step of our research.

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