

First Measurements of Timelike Form Factors of Lambda, Sigma, Cascade, and Omega Hyperons at $Q^2 = 14 \text{ GeV}^2$, and Evidence for Diquark Correlations

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Form factors for timelike momentum transfers, determined by hadron-antihadron formation in $e+e-$ annihilation, provide information about spin correlations between the hadron pair produced, information complementary to that provided by spacelike form factors determined by electron scattering from hadronic targets. Timelike form factors at large momentum transfers have only been so far measured for one baryon, the proton. We have now made the first measurements of timelike form factors of the hyperons, Lambda, Sigma, Cascade, and Omega at the large momentum transfer of $Q^2 = 14 \text{ GeV}^2$. The measurements reveal the variation of these form factors as successively one, two, and three of the up and down quarks in the proton are replaced by the strange quark. Among the interesting observations is evidence for Diquark Correlations in Lambda and Sigma zero hyperons anticipated by Wilczek and colleagues.

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