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Spin Correlations in Dark Photon Searches

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The ForwArD Search ExpeRiment (FASER) searches for dark photons that are produced in the decays of neutral pions and eta mesons and decay into fermion-antifermion pairs. Dark photons are massive gauge bosons of broken $U(1)_D$ symmetry, presenting a remarkably simple extension to the standard model. Previous analyses have neglected spin correlations in signal event generation; however, because the dark photon has non-zero spin, such spin correlations exist. We analytically calculate the cross-section for these decays within the narrow-width approximation, and compare the results with and without spin correlations. We find that spin correlations are not a significant effect on existing dark photon searches.

Mini Symposia (Invited Talks Only)

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