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Massive Quark Scattering at Strong Coupling from AdS/CFT

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We extend the analysis of Alday and Maldacena for obtaining gluon scattering amplitudes at strong coupling to include massive quark scattering. Our quarks are actually the N=2 hypermultiplets which arise when D7-brane probes are included in the AdS_5 x Sˆ5 geometry. We first derive appropriate massive-particle boundary conditions for the string scattering worldsheets. We then find an exact worldsheet which corresponds to the scattering of two massive quarks and two massless gluons and extract from this the leading order IR divergence for this amplitude. We also find a worldsheet for the scattering of four massive quarks in the limit of small quark mass. Our worldsheet solutions reduce to the four massless gluon solution of Alday and Maldacena in the limit of zero quark mass, suggesting that the string worldsheets associated with scattering amplitudes at strong coupling have a universal behavior in the sense that they depend solely on kinematics.

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