On-shell approaches to self-force

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In the last few years, much progress has been made in connecting the field of QFT amplitudes calculations to that of classical physical observables, such as gravitational waveforms and power emitted of merging black holes. These observables typically arise from highly energetic mergers, where point-particle descriptions and flat space approximations start to break down. On the side of classical relativity, this has naturally led to alternative approximation schemes, such as the self-force expansion (valid for extreme mass ratios of the two bodies). However, on the side of amplitudes, flat space QFT is not well-adapted to capture the full non-linearities of this problem. In this talk, I will present recent developments in addressing this gap via amplitudes on strong backgrounds.