abstract We investigate the ability to constrain oscillatory features in the primordial power spectrum using current and future cosmic microwave background observations. In particular, we study the observability of an oscillation arising from imprints of physics at the cut-off energy scale. We perform a likelihood analysis on the WMAP data set, and find that the current data set constrains the amplitude of the oscillations to be less than 0.77 at 2-σ, consistent with a power spectrum without oscillations. In addition, we investigate the fundamental limitations in the measurement of oscillation parameters by studying the constraints from a cosmic variance limited experiment. We find that such an experiment is capable of constraining the amplitude of such oscillations to be below 0.005, implying that reasonable models with cut-off energy scales \( \Lambda > 200H_{\text{infl}} \) are unobservable through the microwave background.