A. INTRODUCTION

Recent experimental investigations of detailed predictions of quantum electrodynamics (QED) have failed to establish conclusively any breakdowns in QED theory. High energy reactions which have been studied include the photoproduction of electron[1] and muon[2,3] pairs at wide angles, electron-electron scattering,[4] electron-positron scattering,[5] and searches for anomalous structure in the electron.[6,7,8] In addition, comparisons between theory and experiment have been made for the anomalous magnetic moments of the electron,[9] positron,[10] and muon,[11,12] for the Lamb shift,[13-16] and for the hyperfine splitting in hydrogen,[17] positronium,[18] and muonium.[19,20] Possible breakdowns in QED theory can be described phenomenologically by <u>ad hoc</u> modifications of a photon or particle propagator.[21-25] More explicit descriptions have recently been studied by Low[26] and Blackmon,[27] who suggested that possible breakdowns in QED may be the manifestations of new undiscovered particles that take part in the electromagnetic interactions. One such description[28] employs a heavy electron, e', coupled to an electron and a photon, $e' \rightarrow e + \gamma$. This coupling would allow the e' to be produced by the electroproduction process

$$\begin{array}{l} e + p \rightarrow e' + p \\ \qquad\quad \lfloor\!\rightarrow e + \gamma \quad . \end{array} \qquad (1)$$

The above reaction would produce a sharp peak in the momentum spectrum of the recoiling protons at a given angle. The peak would be similar in shape