Can the Fano factor $F$ associated to electron shot noise in a quantum conductor be measured without net current flowing through the conductor? We report here experimental results showing that this measurement is possible providing electron-hole pairs are created using radiofrequency photon excitation. The conductor is a Quantum Point Contact realized in a high mobility 2D electron gas. One contact is biased to a.c. voltage $V_{a.c.} \approx \hbar \omega/e$ while the other contact is grounded, where the frequency $\nu = \omega/2\pi = 17.3$GHz or 8.7GHz $\gg k_B T/h$. Electrons emitted by the a.c. biased contact are photo-excited and give rise to a coherent superposition of electron-hole pairs arriving at the QPC. When the transmissions $D_n$ of the QPC modes are different from 0 and 1, the electron-hole pairs dissociates because electrons and holes are separately partitioned into the outgoing states. This produces a fundamental quantum partition noise which we have observed for the first time [1]. No current is associated with these neutral excitations. The zero temperature shot noise is:

$$\Delta T^2 = 4\hbar \nu G \left( \sum_{l=1}^{\infty} l J_l(eV_{a.c}/\hbar \nu) \right) F \Delta f$$

where $F = \sum_n D_n(1-D_n) / \sum_n D_n$. The Fano factor $F$ is straightforwardly related to the noise and can thus be measured (see figure).

Shot noise variations versus conductance $G$ in transmission units observed at 94mK (closed circles). The noise in units of noise temperature. The solid line is a comparison with theory with no adjustable parameters.