Dear Editor,

Please find enclosed the resubmission of our manuscript entitled “Single-photon probing of plasmonic waveguides”. The paper has been revised following closely the comments and suggestions made by the Referees.

In their reports, both Referees are positive about our work and comment on its originality and appropriateness for the 2016 SAIP Proceedings. We are delighted by this and thank the Referees for carefully reading our manuscript. We agree with all their recommendations for modifications and clarifications. We have addressed these in our revision.

We feel that the improved presentation of our study and the further details added in our revised manuscript put it in full agreement with the Referees’ recommendations. We hope that our work can now be accepted for publication in the 2016 SAIP Proceedings.

Sincerely,

Jason Francis

(on behalf of the authors)

Response to comments

Referee 1

Referee 1 requests that the axes labels and numbering of the graph in figure 2a be made more legible. We have increased the clarity of the labels and greatly increased the numbering size. We have further changed the ambiguous y-axis label from “T” to the word “Transmission”, and added units to x-axis. We thank the Referee for their comments and careful reading of our manuscript.

Referee 2

1. The Referee suggests that the plot of $g^{(2)}(0)$ against integration time in figure 3 be replaced with $g^{(2)}$ as a function of the delay time. We thank the Referee for mentioning this important point. The Referee correctly anticipates a dip at zero delay. However, the required measurements to obtain this plot are not possible with the configuration shown in figure 1b. We have added a paragraph (third one in section 2.1) explaining that a variable delay is needed on one of the output signals of the Hanbury-Brown Twiss (HBT) setup. Due to instability over the necessarily long integration times it was only practical to obtain $g^{(2)}$ at a single delay time ($\tau = 0$). In future work, with improvements to the generation rate of our single-photon source, we would like to measure the complete dip. However, we also stress that showing $g^{(2)}(0) < 0.5$ is necessary and sufficient to confirm single excitation states are propagating in the waveguides, which is the main aim of the present work. We have clarified this in our manuscript.

2. The Referee mentions that the word “decoupling” in the last sentence in the last paragraph of the introduction is not properly explained. We thank the Referee for pointing this out and we have replaced this word with “output” which we feel is more suitable given the context. We hope it clarifies the meaning of the sentence.

3. The Referee requests that we better explain the measurement of $g^{(2)}$. We have expanded the first sentence of section 2.1 and introduced an additional sentence to clarify that $g^{(2)}(0)$ is calculated from

measured count rates using equation (6). The measurement procedure to obtain these rates is explicitly mentioned in section 2.1 for the spontaneous parametric down-conversion source, and in section 2.3 for the case involving the plasmonic waveguide. We thank the Referee for mentioning that this was not clear. The Referee also asks that we clarify the use of multimode (MM) fibres in the HBT setup. We have added an explanation to figure 1b and hope that this clarifies why MM fibres are used.

The Referee mentions that the term single-photon counting module (SPCM) usually refers to the single-photon avalanche diode detectors (SPADs). We thank the Referee for pointing out a potential confusion for readers. In our work the SPADs produce a signal of pulses corresponding to photon detections. This signal is then sent to separate electronics of the SPCM which counts the pulses yielding photon count rates. To reduce the confusion between the SPADs and SPCM we have changed "single-photon counting module" to simply "counting module". The change is reflected in figure 1b as well.

4. The Referee suggests a change in the format of the references. We have tidied up the references and checked their formatting complies with the SAIP guidelines.