



Fig. 5. (A) Schematic: photodetecting fiber illuminated by two similar optical beams. Graph: position measurements of the two beams. In black dotted line is the conductivity profile generated by the two incoming beams while the blue dots are the reconstructed positions with the error bars. (B) Schematic: photodetecting fiber illuminated by three similar optical beams. Graph: position measurements of the three beams. In black dotted line is the conductivity profile generated by the three incoming beams while the blue dots are the reconstructed positions with the error bars.

6. Conclusion

In conclusion, axially resolved optical detection was achieved in an axially symmetric multimaterial fiber. A fiber architecture that combines insulating and semiconducting domains together with conductive metallic and polymeric materials was demonstrated. This architecture supports a convex electric potential profile along the fiber axis that can be varied by changing the boundary conditions. As a result, the position, width and the intensity of an arbitrary incoming rectangular optical wavefront could be reconstructed. Under given constraints, two and three simultaneously incident beams could also be spatially resolved. The ability to localize stimuli along an extended fiber length using simple electronic measurement approaches and with a small number of electrical connections, presents intriguing opportunities for distributed sensing.

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