Abstract Submitted
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Spectral splitting with a plasmonic nanowire on silicon chip[1] RU-WEN PENG, Nanjing University, QING HU, Massachusetts Institute of Technology, DI-HU XU, YU ZHOU, REN-HAO FAN, Nanjing University, NICHOLAS X. FANG, Massachusetts Institute of Technology, QIAN-JIN WANG, Nanjing University, XIAN-RONG HUANG, Argonne National Laboratory, MU WANG, Nanjing University — On-chip nanophotonics serves as the foundation for the new generation of information technology, but it is challenged by the diffraction limit of light. Here we demonstrate that by cascading nano-corrugation gratings with different periodicities on silver nanowires atop silicon, different colors can be spatially separated and chronologically released at different grating junctions. The released light frequency depends on the grating arrangement and corrugation periodicities. Hence the nanowire acts as a spectral splitter for sorting/demultiplexing photons at different nano-scale positions with a ten-femtosecond-level interval. Such nanowires can be constructed further into compact 2D networks or circuits. This research may provide a promising approach for realizing spatiotemporal-sensitive spectral splitting and optical signal processing on nanoscales, and for general integration of nanophotonics with microelectronics. Reference: Q. Hu, D. H. Xu, Y. Zhou, R. W. Peng, R. H. Fan, N. X. Fang, Q. J. Wang, X. R. Huang, and Mu Wang, Sci. Rep. 3, 3095 (2013).

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