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## **【154】 Hybrid semiconductor-metal plasmonic waveguide for on-chip sensors in the longwave infrared**

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The longwave-infrared holds various applications ranging from sensing and imaging to optical free-space communication. The increasing demand for miniaturized systems requires the development of compact photonic networks between on-chip optoelectronic components such as lasers, detectors and modulators. To resolve this challenging task, we introduce and experimentally demonstrate a novel type of broadband semiconductor-metal surface-plasmon-polariton waveguide, consisting of a Ge-on-Au structure. It shows total waveguide losses as low as 10.5 dB/mm at 9.5  $\mu\text{m}$ , which remain  $<20$  dB/mm for the entire spectral range between 6–12  $\mu\text{m}$ . This paves the way for a wide range of on-chip applications using novel longwave-infrared integrated systems.

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