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Title: Analysis of plasmon terahertz waveguide formed by a dielectric ridge on semiconductor surface
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Abstract: We study, by the method of the effective index of refraction (EIR), the characteristics of plasmon terahertz waveguide formed by a quartz ridge above the surface of indium antimonide. EIR, propagation length, field distribution, and the condition of single-mode propagation are calculated for the fundamental TM00 mode at different sizes of the quartz ridge. It is shown that, as distinct from usual plasmon waveguides, high degree of field localization and long propagation length can be ensured simultaneously by optimum choice of ridge sizes. Comparison of field distributions calculated by the EIR technique and with COMSOL Multiphysics software indicates a good agreement, especially for not very small sizes of the ridge.