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Active Control of Charge Density Waves at Degenerate Semiconductor Interfaces[1] RAJ VINNAKOTA, DENTCHO GENOV, Louisiana Tech Univ — We present numerical modeling of an active electronically controlled highly confined charge-density waves, i.e. surface plasmon polaritons (SPPs) at the metallurgic interfaces of degenerate semiconductor materials. An electro-optic switching element for fully-functional plasmonic circuits based on p-n junction semiconductor Surface Plasmon Polariton (SPP) waveguide is shown. Two figures of merits are introduced and parametric study has been performed identifying the device optimal operation range. The Indium Gallium Arsenide ($In_{0.53}Ga_{0.47}As$) is identified as the best semiconductor material for the device providing high optical confinement, reduced system size and fast operation. The electro-optic SPP switching element is shown to operate at signal modulation up to -24dB and switching rates surpassing 100GHz, thus potentially providing a new pathway toward bridging the gap between electronic and photonic devices.

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