

## Signal On-Off Ratio and Output Frequency Analysis of Semiconductor Electron-Interference Device

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**Abstract :** We examined the on-off ratio and frequency components of output signals from an electron-interference device made of GaAs/Al<sub>x</sub>Ga<sub>1-x</sub>As by solving the time-dependent Schrödinger's equation on conducting electrons in the channel waveguide of the device. For electron-wave modulation, a periodic voltage of frequency  $f$  was applied to the channel. Furthermore, we examined the voltage-amplitude dependence of the signals in time and frequency domains and found that large applied voltage deformed the output-signal waveform and created additional side modes (frequencies) near the modulation frequency  $f$  and that there was a trade-off between on-off ratio and side-mode creation.

**Keywords :** electrical conduction, electron interference, frequency spectrum, on-off ratio

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