LIGHT EMISSION FROM THERMALLY GENERATED ELECTRON-HOLE PLASMA IN A FIELD-EFFECT SOI-TRANSISTOR

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Field-effect silicon-on-insulator (SOI) transistors are investigated at extremely high drain currents. These currents heat the silicon film of a transistor and cause the generation of thermal electron-hole plasma there. We discovered the red light emission from such a plasma. It appears with increase in the drain current after the extinction of known yellowish-white emission and is of thermal nature. Red light emits in the shape of spots. They are arranged equidistantly in line in the drain area of the transistor. The number of spots increases with current growth. S-shaped sections on both current-voltage and current-luminous characteristics correspond to every new spot appearance. Plasma stratification and formation of lighting spots are explained by the occurrence of thermodiffusion autosolitons.