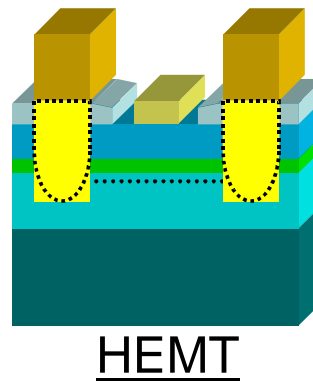


## Novel Heterodimensional Sensors

The project's effort is to prove the feasibility of producing a family of semiconductor light sensors in which sensor noise is substantially reduced by altering the nature of current transport. This is done by; (a) confining the electrons in a reduced dimensional regime such as a quantum well or wire, and (b) producing a contact of a different dimension to this electron cloud. We have indeed gone beyond a feasibility study and designed, fabricated, tested, and hereby report the following family of devices:

- a) A 2DEG photoconductor with large gain
- b) A Barrier enhanced 2DEG Metal-Semiconductor-Metal (MSM) photodetector
- c) A heterodimensional MSM device
- d) A 2DEG Schottky photodiode
- e) A HEMT transistor.



MSM

$$S_{up} - S_{up}$$

$$S_{down} - S_{down}$$

$$O_{hmic} - O_{hmic} \quad 6 \times 10^{17} \text{cm}^{-3}$$

$$O_{hmic} - O_{hmic} \quad 3 \times 10^{17} \text{cm}^{-3}$$

