

# Research and development of 3D detector and LGAD based on 8-inch CMOS Process

*Tuesday, June 18, 2024 4:20 PM (10 minutes)*

At IMECAS, we have pioneered the development of various silicon detectors based on 8-inch CMOS process, encompassing 3D detectors, Low-Gain Avalanche Detectors (LGAD), pixel detectors, and silicon drift detectors (SDD). Our research focuses on investigating innovative 3D detectors, such as double-sided 3D trench electrode detectors (DS-3DTED), back-incidence 3D Composite Electrode Silicon Detectors (3DCESD), hypothetical sphere-electrode detectors, and so on. In addition, we explore the fabrication process of 3D detectors utilizing the 8-inch CMOS process. This has led to the successful creation of a 311  $\mu\text{m}$  deep trench, achieving an impressive depth-to-width ratio close to 105:1. Furthermore, we have developed LGAD in IMECAS, which has found its application in the ATLAS High Granularity Timing Detector (HGTD) program with mass production in our institute. Currently, we are looking to expand our international collaboration efforts and aspire to join international organizations, aiming to contribute to the advancement of high-energy particle/photon detection technologies.

**Primary author:** LIU, Manwen (Chinese Academy of Sciences (CN))

**Co-authors:** XU, Gaobo (Institute of Microelectronics, Chinese Academy of Sciences (IMECAS)); YIN, Huaxiang (Institute of Microelectronics, Chinese Academy of Sciences (IMECAS)); LI, Zheng; LI, Zhihua (Institute of Microelectronics, Chinese Academy of Sciences (IMECAS))

**Presenters:** XU, Gaobo (Institute of Microelectronics, Chinese Academy of Sciences (IMECAS)); YIN, Huaxiang (Institute of Microelectronics, Chinese Academy of Sciences (IMECAS)); LUO, Jun (Institute of Microelectronics, Chinese Academy of Sciences (IMECAS)); LIU, Manwen (Chinese Academy of Sciences (CN)); LI, Zheng; LI, Zhihua (Institute of Microelectronics, Chinese Academy of Sciences (IMECAS))

**Session Classification:** WG/WP2 - Hybrid silicon technologies