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### **InAs HEMTs for high frequency and high speed applications**

Outstanding carrier transport properties of III-V compound semiconductors have shown excellent potential for high frequency characteristics. Among them, III-V HEMTs on various material systems like InGaAs/InAlAs, InAs/InP have emerged promising for millimeter wave and terahertz applications. Many previous reports of record high frequency characteristics have shown InGaAs/InAlAs HEMTs with very high cut off frequency ( $f_t$ ) and maximum oscillation frequency ( $f_{max}$ ). With increase in Indium concentration higher electron mobility can be achieved which can lead to higher operating frequency. Among them, InAs HEMTs have shown high frequency record of 710 GHz for 60 nm gate length. These HEMT structures can be fabricated for high frequency applications using Molecular Beam Epitaxy (MBE) and Metal Organic Chemical Vapor Deposition (MOCVD) techniques. Small gate length devices have shown excellent RF performances over past two decades. Besides, due to high electron mobility, saturation velocity and large conduction band offset in InAs, InAs-channel HEMTs are also promising for high speed and low power applications. InAs pseudomorphic HEMTs on InP substrate have been reported to have less short channel effects (SCE) through cap recess engineering and demonstrated low gate delay time when biased at 0.5V. In conclusion, InAs devices are promising for high frequency applications up to sub terahertz range and high speed low power logic application for post Si CMOS application. The outstanding performances of the device will be presented in this talk.

### **Biography**

Edward Yi Chang has completed his PhD from University of Minnesota, USA. He is the VP of Research and Development and Dean of International College of Semiconductor Technology, NCTU, Taiwan. He has published more than 100 papers in reputed journals and is an IEEE Fellow and Distinguished Lecturer.

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