2018 THz workshop

Title: **High-power and frequency-tunable terahertz gyrotrons**

The gyrotrons can generate high-power radiation sources from millimeter to terahertz waves and have various applications. This talk will cover two parts. First, I will talk about the development of the frequency-tunable, 203-GHz, TE02 gyrotron based on the backward-wave interaction. Unlike step-tunable type where oscillation frequencies change discretely, this scheme continuously adjusts the oscillation frequency by varying the magnetic field or the beam voltage. Second, I will show you that TM modes, which have long been considered as unsuitable modes for the gyrotron operation, are in favor of the backward-wave interaction, surprisingly, and suggest that TM modes might be suitable for the gyrotron backward-wave oscillators.

**Tsun-Hsu Chang** (M’99-) received his B.S. degree from National Central University in 1991 and Ph.D. degree from National Tsing Hua University in 1999. He joined the Department of Physics, National Tsing Hua University, in 2003 as an Assistant Professor and in 2011 he became a full professor. He served as the vice-chair of physics department for four years (2008/08-2012/7) and the chair of Interdisciplinary Program of Sciences for two years (2013/2-2015/1). Professor Chang’s current research interests focus on the development of frequency-tunable terahertz gyrotron. He also interests in the microwave/materials processing and characterizations. Right now, his group can measure the complex permittivity and permeability from 1 GHz to 1 THz using various techniques. Also, he studies the superluminal effect and develops the low-loss terahertz waveguide.