Lasers and Detector Session Summary
Chairs: John Degnan and Ivan Prochazka

The Czech Technical University reported the latest results on their space-qualified photon counting module for the Chinese Laser Time Transfer Project [Prochazka et al]. The silicon K14 SPAD has the following properties at 532 nm:

- Active area: 25 micron diameter
- Quantum Efficiency: 10%
- Timing Resolution: 75 psec
- Dark Count Rate: < 8 kHz @ 20^{o}C
- Operating Temperature Range: -30^{o}C to 80^{o}C (no cooling)
- Power Consumption: <400 mW
- Mass: 4 g

In addition, it is highly resistant to solar and ionizing radiation (100 krad) damage and has an expected lifetime of greater than 10 years in space.

Andreev et al reported on a very different laser approach based on Stimulated Raman Scattering (SRS) pulse compression which produced 25 psec, 1 mJ pulses, at a 1 kHz rate and with good spatial mode quality (M^2 = 1.1). Using a Nd:YAG Master Oscillator (MO) and three single pass Nd:YAG amplifiers in conjunction with a Ca_8Fl_{16} SRS cell, they generated 100 mJ, 350 psec pulses at 1319 nm. They used this radiation to pump a $Ba(NO_3)_2$ SRS-MO and two SRS amplifier cells to obtain 50 mJ, 30 psec pulses at an eyesafe wavelength of 1530 nm and a 100 Hz rate. It was observed that the Raman conversion efficiency decreased noticeably at kHz rates for the higher peak pump powers.

Gao et al reported on diode-pumped lasers for tracking satellites and space debris. For SLR, 10 psec pulses are generated from a SESAM (Semiconductor Saturable Absorber Mirror) mode-locked laser oscillator, regenerative amplifier, and power amplifier. For debris tracking, they use two nanosecond pulses from a 230 watt multistage system consisting of a single frequency oscillator, preamps, power ampfiliers and SBS cells.