Abstract

- Technological advances are exploited by a Thomson scattering diagnostic on the Pegasus Toroidal Experiment
  - New diagnostic leverages high-energy pulsed laser, VPH diffraction gratings, ICCD cameras
  - Pegasus is a spherical tokamak ($A \approx 1.2$, $B_{T,0} \approx 0.1$, $I_{p,max} \approx 0.2$ MA)
  - Typically $n_e = 10^{18}$ - 5×10^{19} m^{-3}; expected $T_e = 10 – 500$ eV
- Photon source is a Nd:YAG Q-switched laser
  - Operated at first harmonic, 532 nm
  - Pulse is characteristically 2 J, 7 ns FWHM, <10 Hz rep rate, $dia_{min} < 3$ mm
- Beamline and viewing geometry optimized
  - 7 m long beamline, minimal turning mirrors, high F/# PCX focusing lens
  - Collection area spans >70% of plasma radius, 1.4 cm radial resolution
- Diagnostic designed for moderate range of plasma conditions
  - Typically $>4\times10^3$ collection photons for $n_e > 0.5\times10^{19}$ m^{-3}, $T_e > 10$ eV