RUBIDIUM VAPOR FILTER SPECTRALLY FILTERED RAMAN/THOMSON SCATTERING

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A new spectrally filtered light scattering apparatus is presented based on a diode laser injected seeded titanium:sapphire laser and rubidium vapor filter at 780 nm. It is shown that the realizable attenuation of quasi-elastically scattered light, limited by a residual broad spectral line width, unseeded, component to the laser output, is as high as 5×10^5 using the laser system alone. Preliminary measurements incorporating a set of dispersing prisms and a stimulated Brillouin scattering Phase Conjugate Mirror external to the laser appear to provide additional extinction. The utility of the system for measurement of electron density and temperature by Thomson scattering is demonstrated in a 30 torr argon dc discharge. At 100 mamps current an electron density of 5.52×10^{13} cm^{-3} is measured on the discharge center line with a 2σ value of statistical uncertainty equal to 1.2×10^{12} cm^{-3}. The corresponding electron temperature is 1.26 ± 0.05 eV.