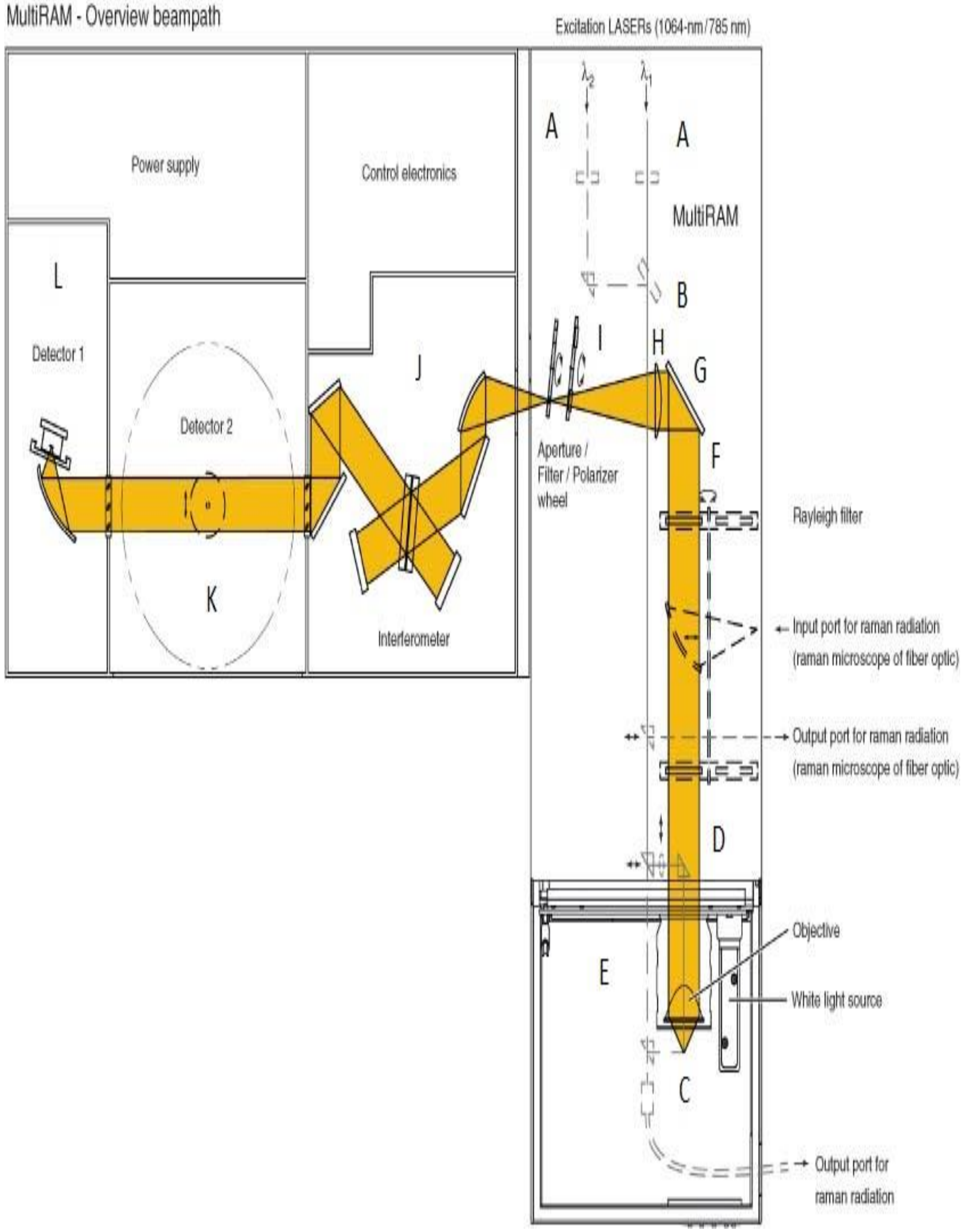
Optical path diagram



BRUKER RFS 27 MultiRAM is a stand alone FT Raman Spectrometer with a scan range 4000-50 cm^{-1}. It is equipped with a purgeable sealed optics housing. The source is Nd-YAG laser (1064nm) in addition there is a white light source for Raman Background correction and built in alignment lamp for sample alignment and calibration. The sample stage is pre aligned with computer controlled z-positioning. Scattered light is collected at 180° using a high throughput lens. The Interferometer is permanently aligned. Polystyrene and Naphthalene standards are regularly used for testing Signal to Noise ratio and wavenumber accuracy.

Working Principle:

Light from the source (Nd-YAG laser) passes through an optional half waveplate (A) with a software controlled rotation unit and can hit an optional dielectric mirror(B). If two lasers are installed, this dielectric mirror transmits the first laser wavelength and reflects the second laser wavelength by different prisms to the sample (C). The standard configuration includes a 180° (D) excitation of the sample, whereas the optional 90° excitation (E) can be activated by software control. The Raman light is collected by a lens and filtered by a cut-off filter (F). In case of more than one wavelength excitation the cut off filter (F) which filters the laser wavelength, is assembled on a rotatable wheel. From the mirror (G) the light travels through a lens (H) to the beam entry port. The modulated IR light is directed from the entry port and hits the beamsplitter (J). The beam splitter directs the light to the detector (L) or to the optional detector (K).

Interferometer: The broadband light source yields a continuous infinite number of wavelengths. The interferogram is the continuous sum, i.e. the integral of all the interference patterns produced by each wavelength. This results in the intensity curve as function of the optical retardation. At the zero path difference of the interferometer ($\Delta x=0$) all wavelengths undergo constructive interference and sum to a maximum signal.

As the optical retardation increases different wavelengths undergo constructive and destructive interference at different points and the intensity therefore changes with retardation. For a broad band source, however, all the interference patterns will never be simultaneously in phase except at the point of zero path difference and the maximum signal occurs only at this point.

Applications: Typical applications include structure determination, multi-component qualitative and quantitative analysis.