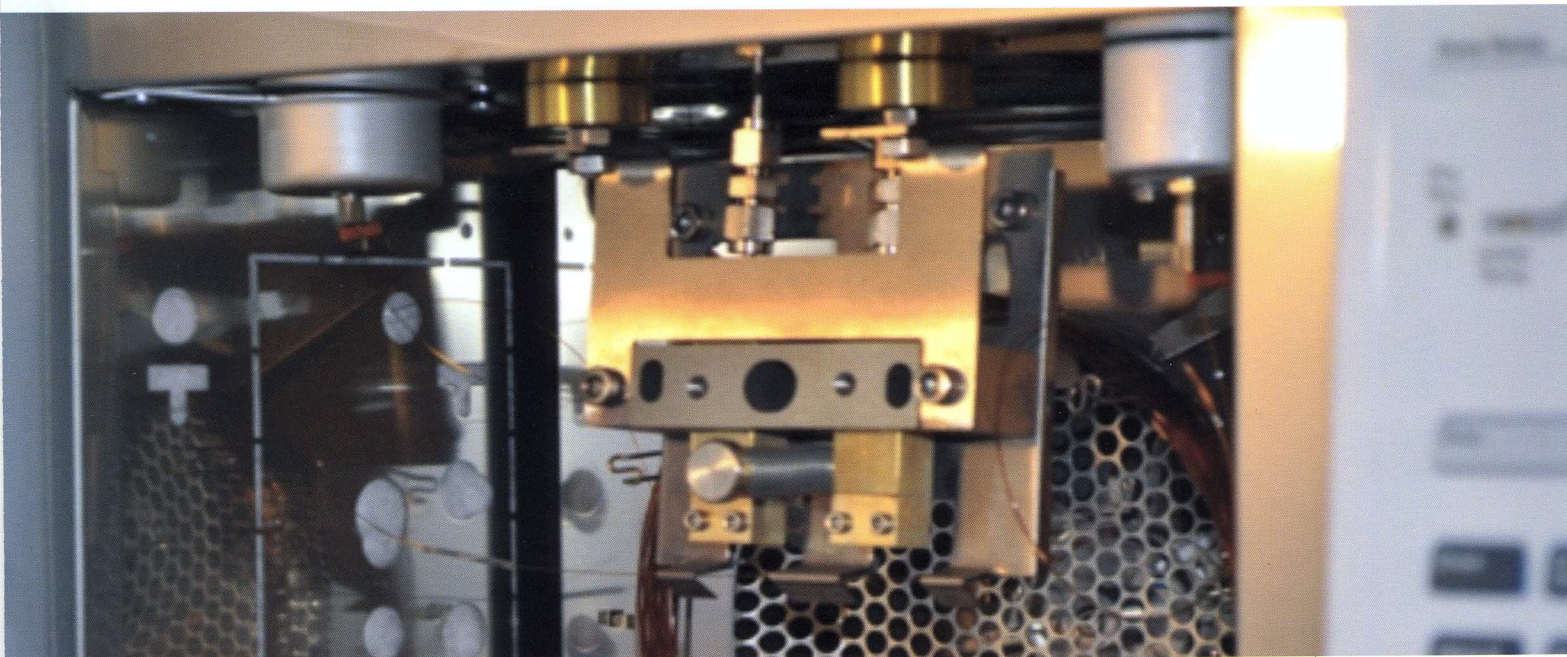
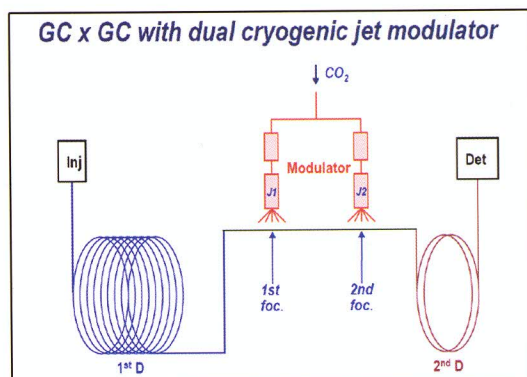
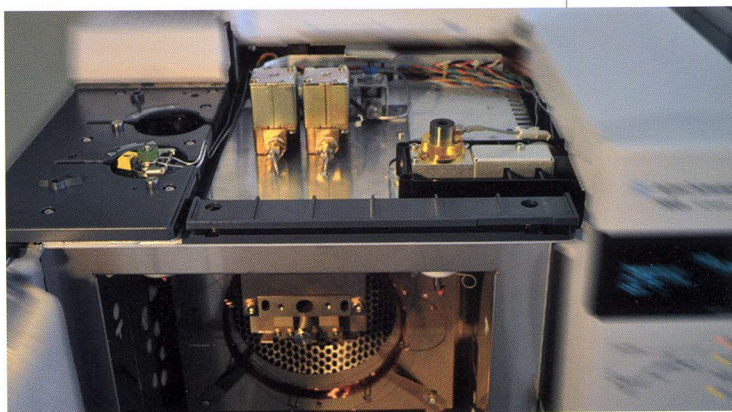


# TWO-DIMENSIONAL GAS CHROMATOGRAPHY



Comprehensive Two-dimensional chromatography is one of the newest and fast growing techniques for analysis of complex samples. "Duojet" is a Comprehensive Two Dimensional Gas Chromatograph with Dual Jet Cryogenic Modulator which has been designed and produced by Kimia Shangarf Pars Research Company. "Duojet" can provide reliable two dimensional data from complex samples and "GC Image" is our offer for data processing of the resulting data. We can offer our specially designed modulator for any GC you already have in your laboratory and wish to upgrade it to a powerful GCXGC. Synchronized start with GC Data acquisition, precise modulation time, easy chromatography column installation, easy installation on different types of GCs and in line liquid CO<sub>2</sub> filters to prevent nozzle clogging are some of the features of KSP designed Modulator.

"GC Image" software is designed for processing of 2D chromatography data in a user friendly way. 2D and 3D presentation of chromatograms, calculation of peak area or peak volume, components table, different types of calibration modes, peak naming and automatic identification of calibrated peaks in easiest way are some of the capabilities this software offers.



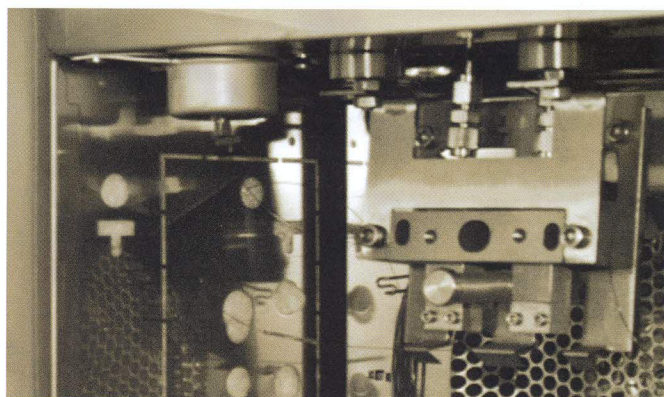
Schematic Diagram of the Process



### Limitations of Conventional GC (1D)

Insufficient separation for complex samples, such as:

- Petrochemical samples
- PCB's (209 congeners, 46 isomers)
- Toxaphene (= chlorinated borates, 32768 congeners)
- Flavours (coffee aroma: >> 700 compounds)
- Analytes in complex matrices (soil, fruit, biological)



### FEATURES

- The Separation power of GCxGC is considerably higher than conventional capillary GC
- GCxGC offers better sensitivity than conventional capillary GC due to the focusing effect of the modulation.
- GCxGC generates structured chromatograms which make the technique more suitable for sample screening than conventional capillary GC as it gives.
- GCxGC technique is compatible with all type of injection systems and sample handling techniques used in GC because the first column is conventional.
- GCxGC is simple to interface with TOF MS leading to an exceptionally powerful GC/MS system able to separate and identify the most complex samples.
- GCxGC reduces the need of complex sample preparation procedures as the separation power of the technique is so large to eliminate the interferences critical in conventional GC separations.

### SPECIFICATIONS

<b>Cryogenic Modulator</b>	Communication	RS232 Serial Port
	Type	Sequential Dual Jet
	Coolant	Liquid CO <sub>2</sub>
	Refrigerant Flow	Adjustable
	Column alignment	Mechanical
	Modulation Cycle Time Selection	Adjustable 0 to 60 sec.
	Modulation Start Daley	Yes
	Jet type	Steel pipes with Brass Body, Replaceable
<b>GC control and data acquisition</b>	Depends on GC Type	
<b>2D data processing "GC Image"</b>	Automated Peak Recognition	Yes
	3D Automatic Integration	Yes
	Single or Group Processing	yes
	Display selection	Rotation 3D color plot, Apex map, One dimensional chromatogram
	Calibration	Different types of calibration
	Calibration fit	Linear
	Software noise reduction filters	Yes



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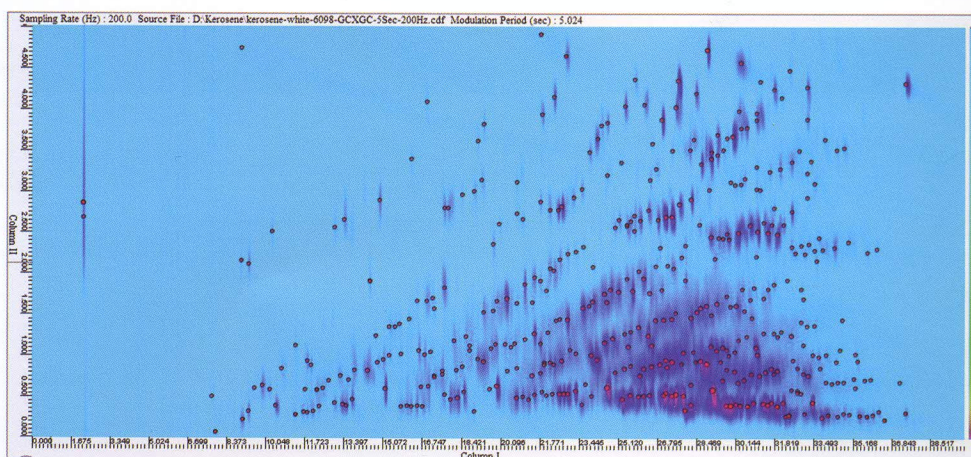
# Applications

- Petroleum & Petro chemistry
  - Compositional characterization of petrochemical fractions
  - Group-type and target analyses
- Food & Flavours
  - Fingerprint complex essential oils
  - Ordered patterns for identification of structurally related compounds
  - Enantiomeric recognition of several components in highly complex samples
- Biomedical
- Forensic
- Environmental
  - Separation of target compounds from matrix
  - Possible reduction in need for sample clean-up procedures
  - VOCs Analysis
  - PAHs Standard mixture
- Geochemistry
- Chemical / Industrial

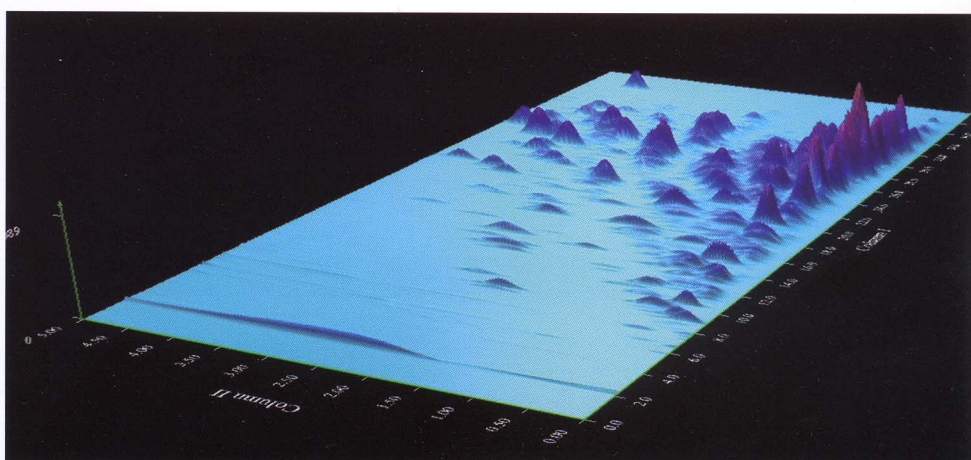
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# Results

2D chromatogram of a Kerosene sample analyzed by “Duojet”

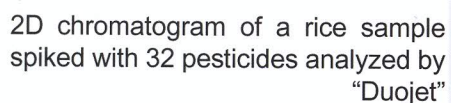
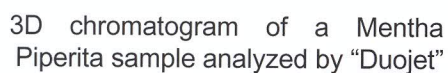
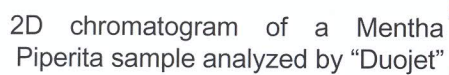


3D chromatogram of a Kerosene sample analyzed by “Duojet”





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