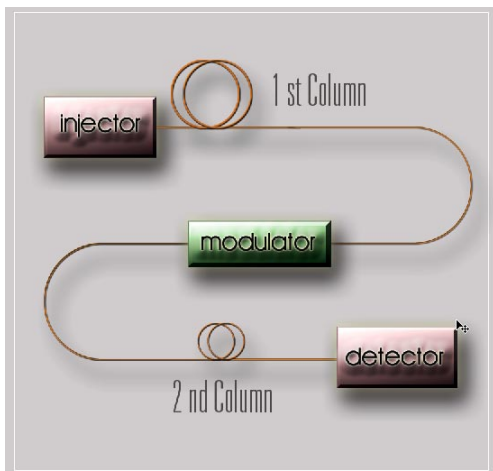


## What Is GCxGC ?

The GCxGC acronym suggests “multiplying” one GC by another. In GCxGC, the peak capacities of two GC columns multiply, resulting in enormous resolving power.

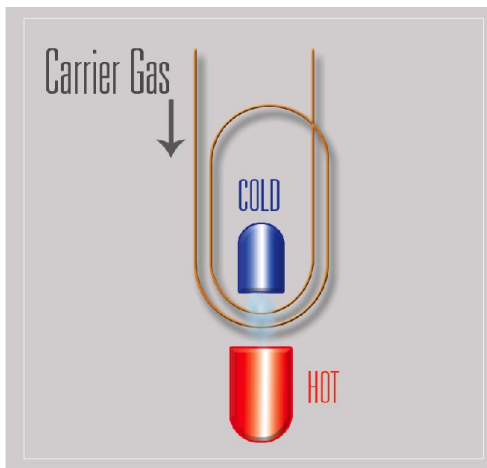
## What is a modulator?

A modulator periodically “cuts” effluent from a first GC column and transmits it onto the second column. A modulator is a repetitive “injector” for the second column.



## What is a Loop Modulator?

The “loop-modulator” is a length of column looped through the paths of intersecting hot and cold gas jets. Every few seconds, the hot jet fires, thereby heating the cold spots and releasing trapped analytes. Two cold spots are used because two cryogenic focusing steps produce very sharp injections onto the second column.

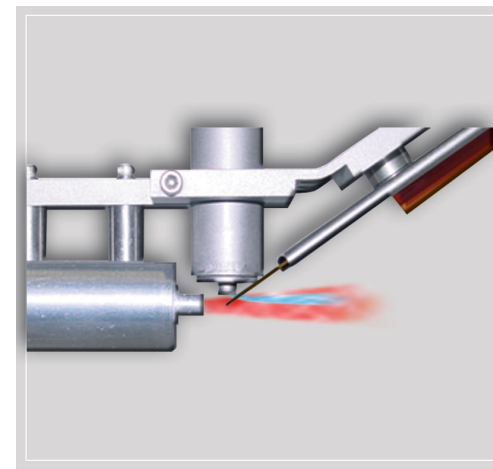


## What does it look like?

The image below is a side-view of the Loop Modulator. The cold jet is directed downward; the hot jet is directed horizontally. The modulator tube is diagonal.

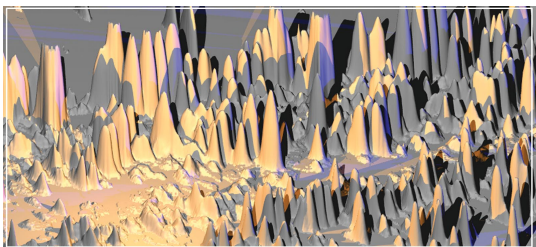
## How does it work?

When the hot jet fires (center), analytes trapped in the cold spots are remobilized. Analytes leaving the downstream cold spot proceed to the second column. Analytes leaving the upstream cold spot enter the loop, and are refocused in the second cold spot.



## What does it do?

Each modulation cycle releases a sharply focused “chemical pulse” from the cold spot, which is only 36 ms wide at its base -- a nearly ideal “injection” onto the second column.



GCXGC chromatogram of kerosene

### What are GCxGC benefits?

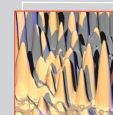
10x increase in GC resolution 5x increase in sensitivity  
No cost in analysis time  
Compound class information Automatic operation  
Routine Quantitation

### What are GCxGC applications ?

- Petroleum
- Environmental
- Flavors and Fragrances
- Forensics
- Quality Assurance
- Industrial Process Diagnosis
- Pharmaceuticals



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