SYNAPT™ XS

Ultimate flexibility for DEEPER DISCOVERY

Waters

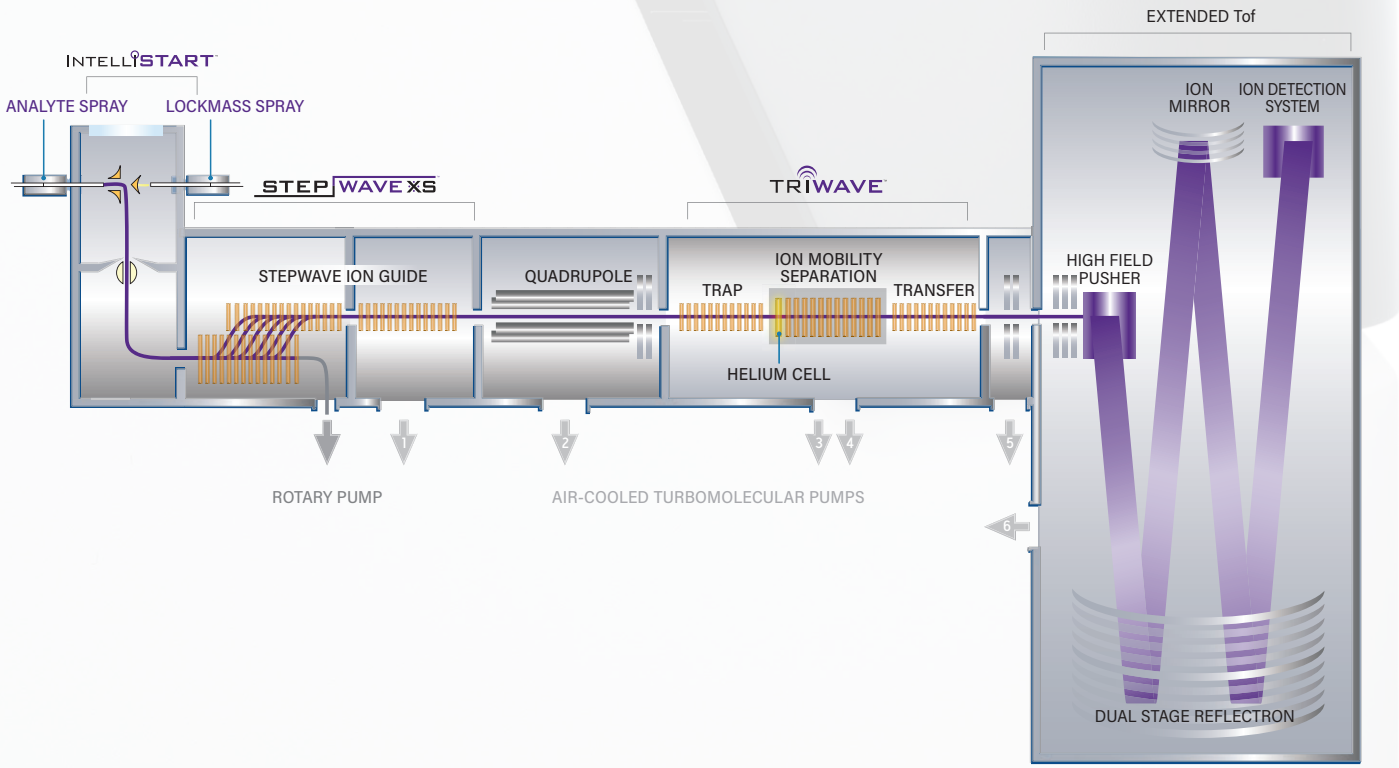
THE SCIENCE OF WHAT'S POSSIBLE.™

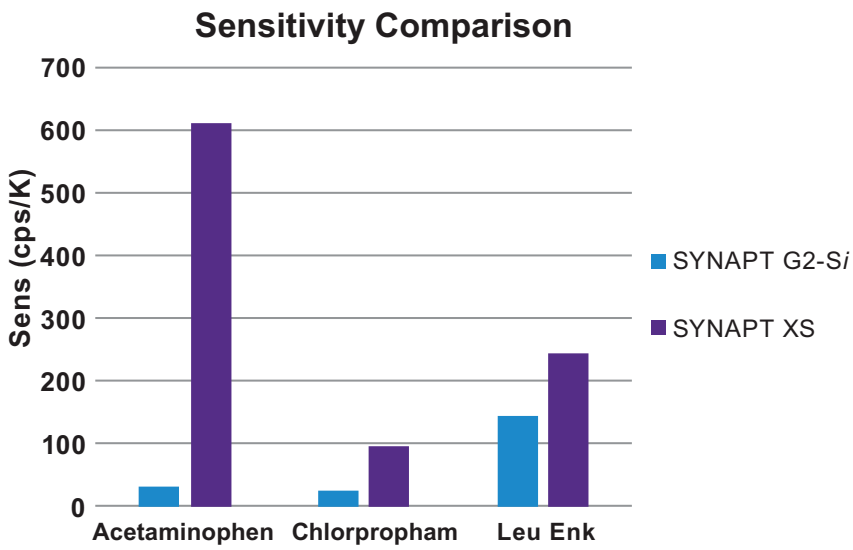
Without discovery, decisions are made in the dark.

In the arena of scientific discovery, the slow pace of advancement and escalating costs of research can prove challenging. Without efficient, expedient discovery the scientific translation process is obstructed, ultimately hindering the creation and improvement of preventive, diagnostic, and therapeutic interventions for human health and advancement.

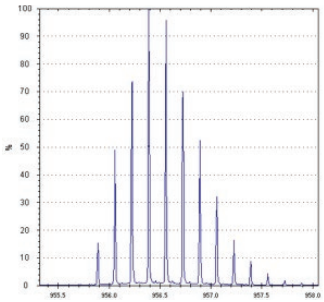
The SYNAPT™ XS Ion Mobility Time-of-Flight Mass Spectrometer provides ultimate flexibility, offering greater freedom of analytical choice to support scientific creativity and technical success for any application.

Our commitment to produce better science through better data is designed into the inherent reproducibility and repeatability of the SYNAPT XS, both day-to-day and instrument-to-instrument. Providing validity of experimentation that can be trusted, expediting the discovery process and allowing confident forward movement towards innovation.

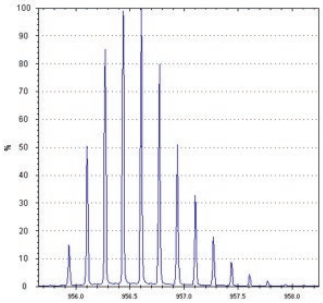




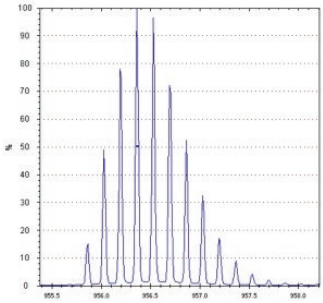
Sensitivity comparisons for selected small molecules on the SYNAPT G2-Si and SYNAPT XS showing superior sensitivity for all compounds on the SYNAPT XS utilizing the redesigned StepWave™ XS.



Enhanced Resolution mode (W)
80,308



High Resolution mode (W)
70,365



Resolution mode (V)
59,216

Mass resolution of bovine insulin on the SYNAPT XS showing superior resolving power required to solve complex analytical problems.

VERSATILITY

MALDI and DESI
Advanced MS imaging technologies and accompanying High Definition Imaging (HDI™) Software simplify and streamline the mass spectral imaging workflow and deliver multi-layered, information-rich data.

HDX
Enables automated higher order structure determination thorough confident identification and best-in-class reproducibility.

ETD and CID fragmentation
Complementary fragmentation techniques with high resolution and accurate mass measurements providing enhanced MS/MS possibilities.

Variety of inlet options
Serve the broadest range of applications with the most extensive range of chromatographic inlets for ultimate flexibility.

SONAR™/MS^E/HDMS^E
With DIA modes, fragment ion information is attainable for every detectable component for unambiguous confirmation of compound identity.

FastDDA/HD-DDA
Generate fragmentation data with low limits of detection and elevated number of detectable compounds in mixtures with enhanced speed and sensitivity.

HIGH PERFORMANCE

StepWave XS
Redesigned segmented quadrupole transfer optics that provide enhanced sensitivity and robustness for challenging compounds.

Extended Flight Tube
Delivers UPLC-compatible mass resolution, matrix-tolerant dynamic range, and quantitative results for the most complex samples.

SONAR and HDMS^E
Complementary data independent acquisition (DIA) modes of operation that increase analytical peak capacity providing 'clean and clear' fragmentation data. A truly unique investigative toolbox for the interrogation of complex mixtures.

TriWave™ IMS
Uniquely designed to maximize sample separation in analytical workflows using ion mobility. Delivering the most comprehensive structure characterization, or increasing analytical peak capacity. All while deriving diagnostic information on molecule confirmation.

ACCELERATED SUCCESS

Engineered Simplicity™
A design philosophy that delivers a combination of the highest performance with system versatility and simplicity of operation.

End-to-End Application Solutions
As well as chemistries and hardware, Waters supplies dedicated application focussed software to meet the needs of analytical research, ensuring a seamless approach to any experiment.

IntelliStart™
Embedded routines provide simple and automated system checks to ensure that the system is always operating as expected.

Unique toolkit for complex mixtures and complex structures

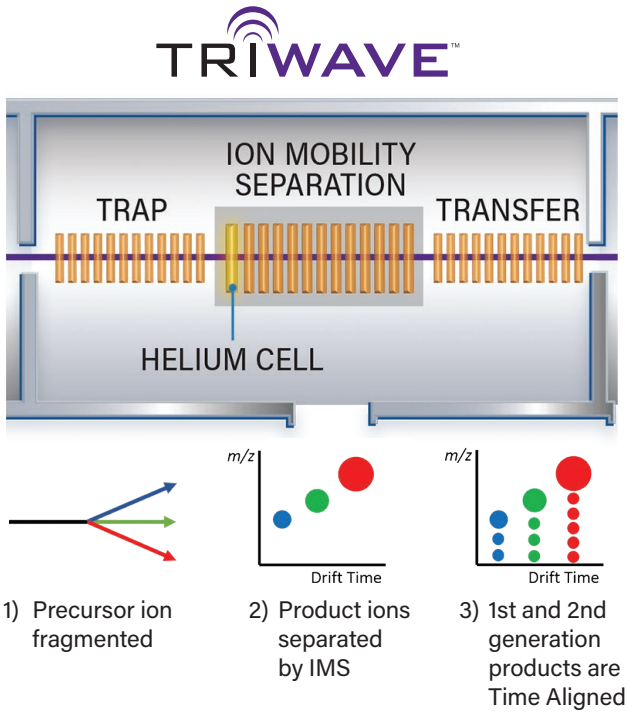
With both SONAR and ion mobility separation (IMS) based data independent acquisition (DIA) modes of operation on the SYNAPT XS, the discovery analyst is in a unique position to interrogate complex mixtures by complementary strategies. Both types of acquisition increase analytical peak capacity, providing 'clean and clear' fragmentation data, but based on different molecular properties.

ION MOBILITY SEPARATION AND COLLISION CROSS SECTION DATA

The SYNAPT XS allows separation of molecules according to their size, shape, and charge during ion mobility experiments as a function of their collision cross section (CCS). The measured CCS of an ion can be used to help confirm its identity or investigate its structure. Ions are manipulated (trapped, accumulated, released, separated, and fragmented) in a simple, precise, and efficient manner. The inclusion of IMS increases the confidence with which a scientist can profile complex mixtures and complex molecules, and dramatically enhances sample definition.

TAP FRAGMENTATION

Time aligned parallel (TAP) fragmentation is an acquisition mode unique to the TriWave IMS design. The TriWave configuration allows the pre- and post-IMS T-Waves to operate as two separate collision cells. The resultant CID-IMS-CID instrumental operation provides ultra confident structural characterization of components. TAP fragmentation delivers a distinct advantage for building a complete structure, through superior fragment ion coverage, sensitivity, and accuracy compared to traditional MS^n or MS/MS techniques.

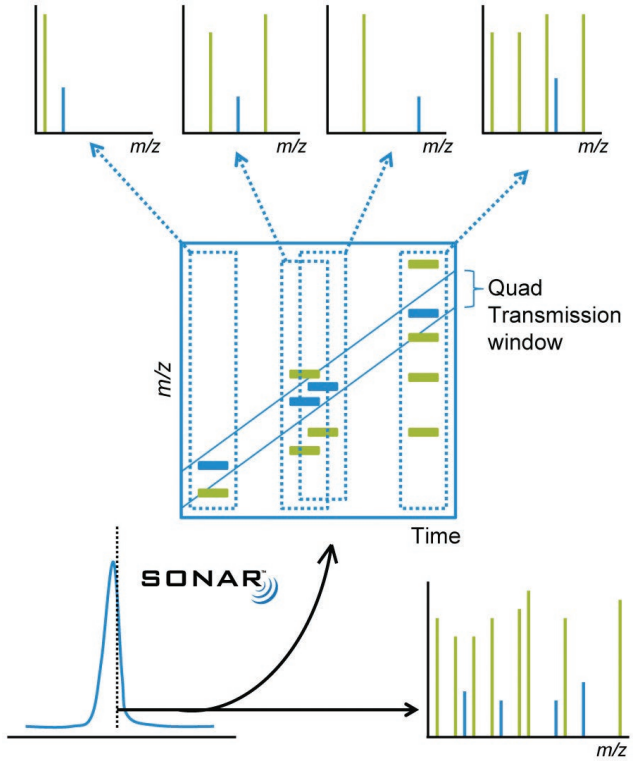


Schematic showing Time Aligned Parallel Fragmentation.

SONAR

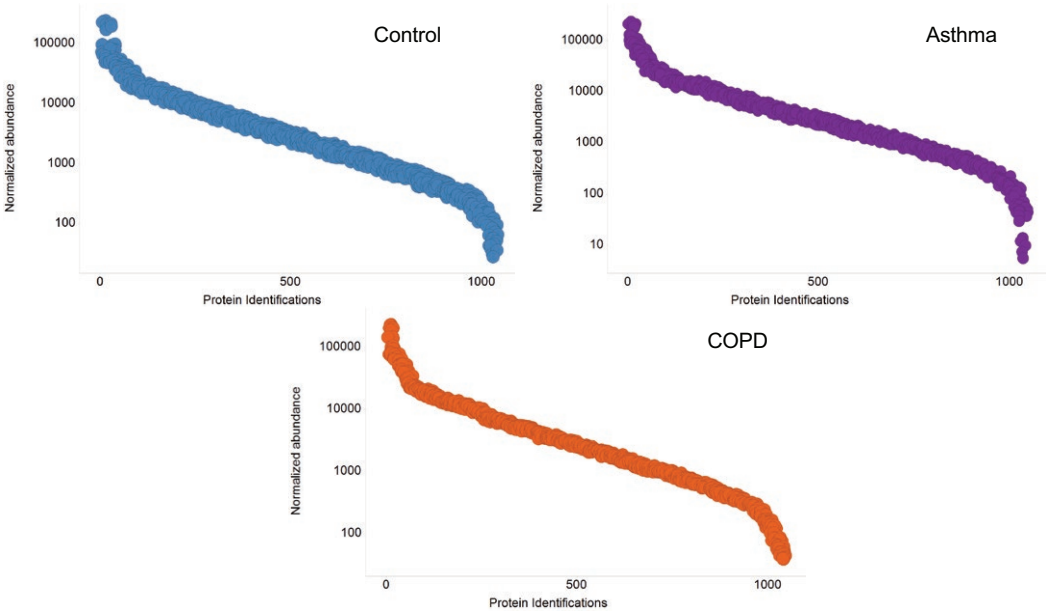
SONAR™ is a mode of operation that collects fragmentation spectra from Data Independent Acquisition (DIA). This is achieved by sliding a resolving quadrupole window over a specified mass range during an MS scan, giving increased selectivity compared to a conventional DIA experiment. With SONAR data comes increased fragmentation spectral clarity and ions of interest are easier to identify. Overall increased selectivity leads to greater knowledge of your samples and confidence in the results, and reduces the need for time consuming repeat analyses.

Alongside the diverse acquisition strategies, dedicated software packages provide a well-rounded developer's toolkit allowing the discovery researcher to effectively and efficiently mine and compile data from complex mixtures and complex structures.



During each scan the quadrupole separates co-eluting precursor masses by scanning the mass range, and transiting them in sequence. Fragment ions from different precursors can then be recorded separately and assigned with confidence.

It has been demonstrated that SONAR experiments exhibit over 3–4 orders linear dynamic range, meaning that it is possible to capture high levels of qualitative and quantitative detail of real world sample complexity.



Anaylsis of plasma proteins from control (blue), asthma (purple), and COPD (orange) patient cohorts showing over 3–4 orders linear dynamic range measured for each biological condition. Each of the conditions shown comprise of three technical replicates.

Experimental options

With an ever-increasing need for the greatest variety of analytical strategies to effectively tackle inherently challenging questions, SYNAPT XS combines high-performance with unparalleled flexibility. Unlike other systems with restricted inlet options, scan function limitations or requiring multiple platforms, only Waters offers an all-encompassing high-performing LC-MS solution which, by design, provides greater freedom of analytical choice to support scientific discovery.

WATERS GLOBAL SERVICES

Delivering world renowned services and support

Waters Service and Support offerings are tailored to optimize your laboratory productivity while addressing your budget realities. Our offerings help maintain system peak performance, minimize down time, address scientific application challenges, and support stringent compliance requirements. As your services and support provider, we are committed to the success of your laboratory and business.

Waters quality support and consultative services ensure your success wherever your laboratory is located in the world.

Confirmit ACE AWARDS
Achievement in Customer Excellence

Waters has consecutively earned the ACE Award since 2001 for providing best-in-class technical knowledge, issue resolution, and process support.

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