



Gencoa Optix

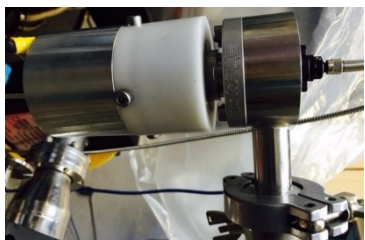
Residual gas sensing in vacuum 'at the speed of light'

10 Years of Optix technology

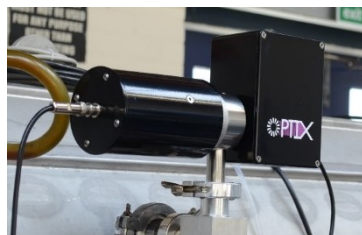
Groundbreaking development

- Introduction to the market in Feb 2017
- Original product development as there were no similar products on the market
- Over 500 global instals to date (US, Europe, China, Japan, Korea)
- Customers including Apple, CERN, GKN, PPG, Linde, US National Labs, General Electric, ASML...
- Rapidly increasing sales volumes due to growing popularity

Development (2015 – 2017)



Market introduction (2017)



"Version 2.0" (2020)



"Version 3.0" (2025)



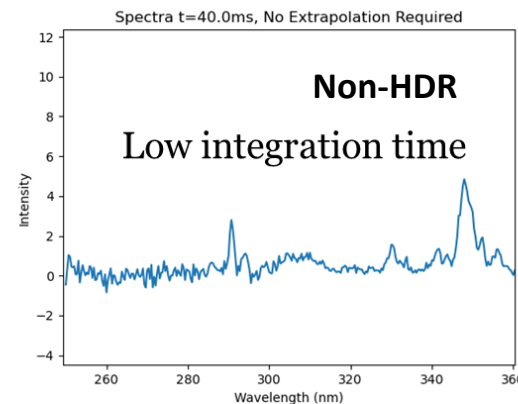
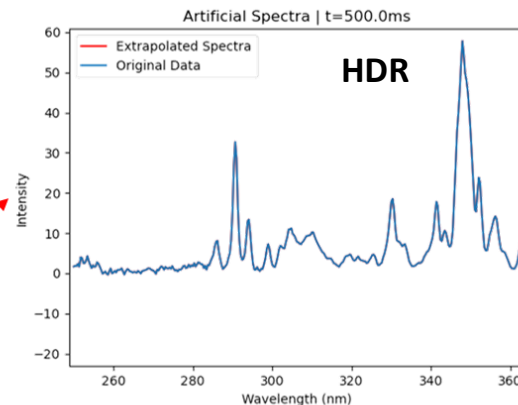
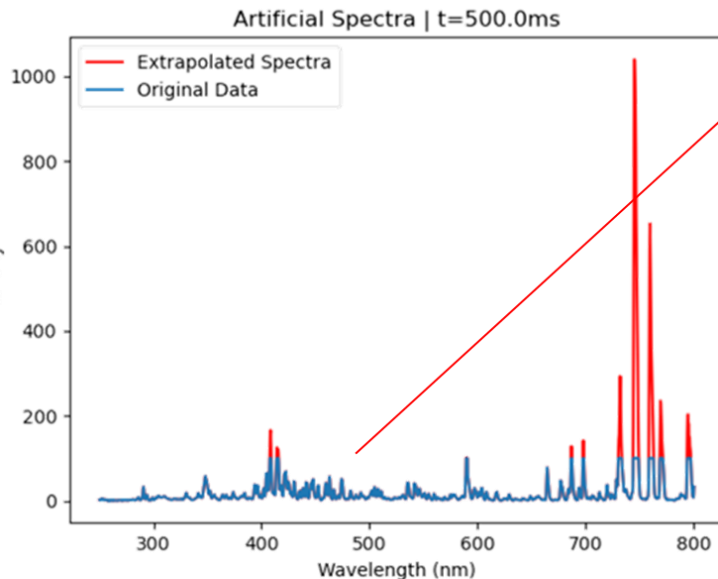
2015

2025

HDR data processing

High Dynamic Range used to enhance sensitivity

- HDR is a proprietary Optix algorithm that automatically **enhances measurement quality**
- **HDR improves sensitivity** - allowing for measurement of **smaller gas partial pressures**
- Optix acquisition settings (integration time, averaging) are **automatically optimised** for best signal quality



Similar to HDR photography where a photo is created by capturing multiple images with different exposures at the same time.



Image: https://vmi.tv/blog/learn-help/hdr_reality_and_monitoring-a_dops_perspective/

2025 Product Update

Improved functionality and smaller format



“Version 2.0” (2020)



“Version 3.0” (2025)

Design and performance improvements

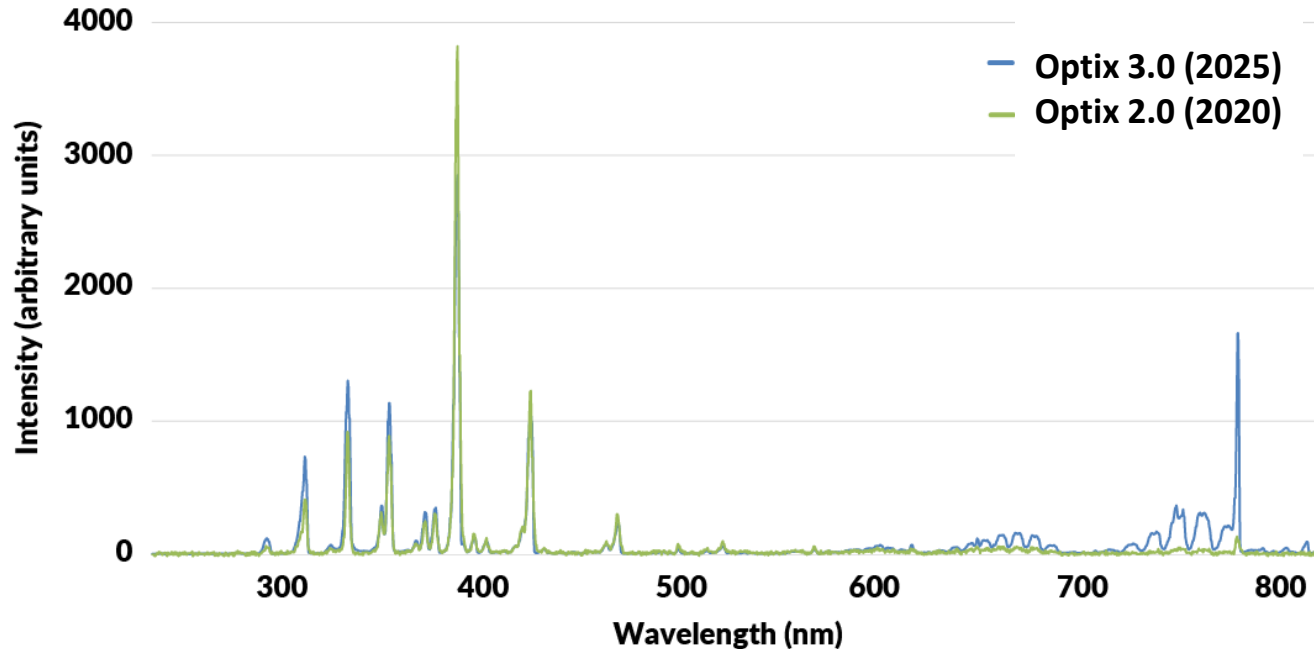
- Updated “HDR” spectral processing
- Power electronics built in – no external power supply
- Smaller overall space claim
- Fewer cables – 24V DC and Ethernet/USB
- Improved spectrometer > x10 Ar and O2 detection
- Higher Sensitivity (HS) spectrometer option – x2 compared to standard version

Spectrometer improvements 2025

A new spectrometer delivering improved sensitivity

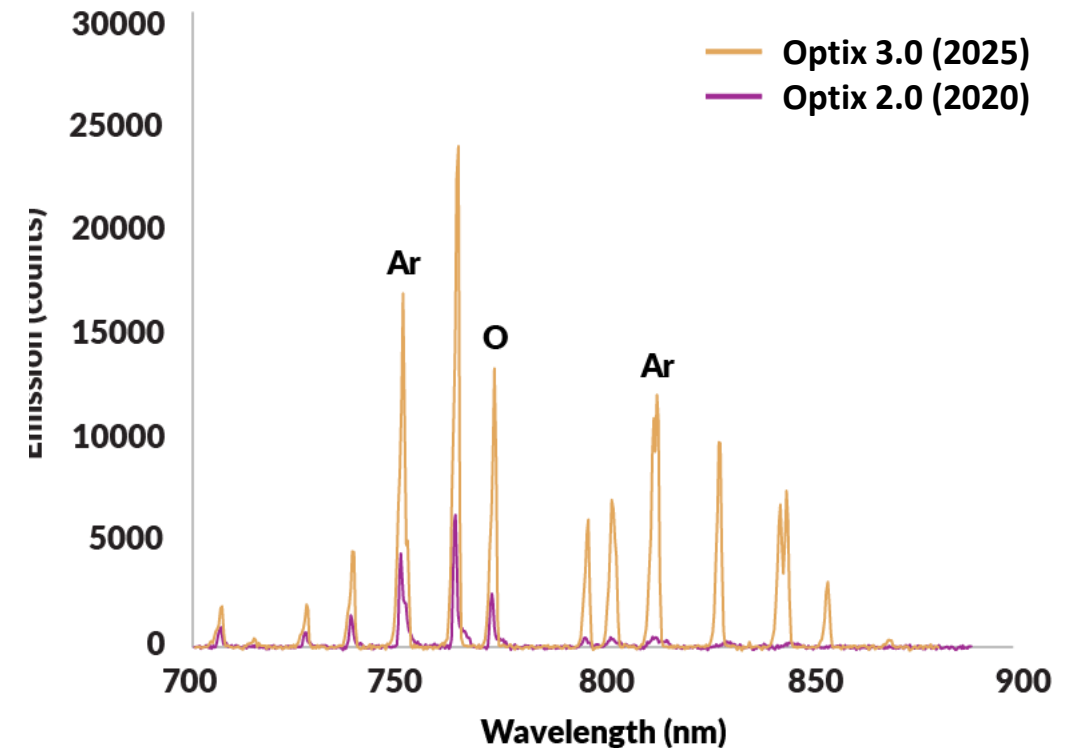
Flatter spectral response

Optix Spectrometer Comparison



Significant sensitivity improvements for Ar and O₂

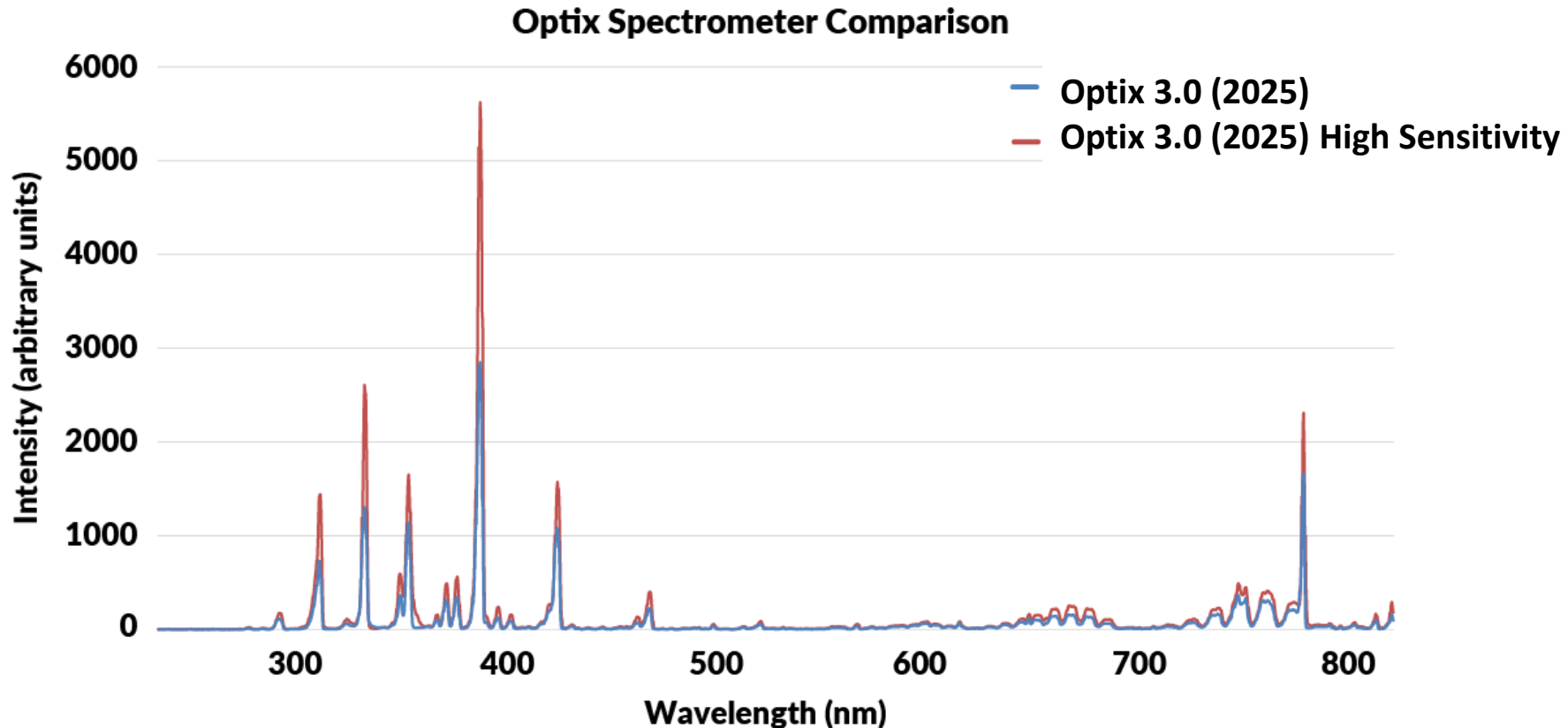
Optix spectrometer sensitivity



HS High Sensitivity Optix

Optional HS version can be incorporated where extreme sensitivity required

- Up to 2x the sensitivity of the new 2025 standard Optix, and 20x the 2020 model



Applications for OPTIX

Optix is an invaluable general-purpose tool for any company involved in the use or manufacture of vacuum equipment

- Easy to use and operators won't break.
- Identifies large leaks – does not require a good vacuum
- Helium leak detectors struggle with too large a leak requiring long recovery times
- Small and portable, so can be carried onto a plane for on-site service support
- Identify source of leaks – eg will differentiate between air (N₂) and water (OH) leak
- Use of Argon or CO₂ as a tracer gas for leak location detection is easier than Helium – Ar and CO₂ do not spread as quickly and so leak location is can be pin-pointed faster
- Machine and process qualification can be assisted by Optix – allows the monitoring of gas levels and pressure to check proper operating function
- Good way to demonstrate repeatability to customer for system sign-off.

HOT areas of application

Optix adoption is increasing rapidly in a range of sectors

- ***High speed leak checking of batteries*** reduces typical analysis time to < 1 second
- ***Trace gas detection at elevated pressures*** direct sensing at rough vacuum pressures
- ***Semiconductor production*** to use high speed data collection to track condition of tools
- ***Vacuum PVD deposition*** to track process data for quality control and problem identification
- ***Vacuum ALD deposition*** to crack and monitor precursors to reduce the quantities used & increase the deposition rates
- ***Hot Isostatic Pressing*** to monitor the powder vacuum degassing stage to speed-up process
- ***Hot Isostatic Pressing*** to find leaks in the HIP cans prior to processing
- ***Outgassing*** of parts and plastics under a vacuum, plasma treatment, roll to roll
- ***Automated Leak Detection*** of components, any tracer gas can be used, autodetection during pump-down
- ***Vacuum Heat Treatment / Metallurgy*** to find leaks and process material problems
- ***CVD and low pressure nitrocarburizing*** – use the gas purge feature to maintain sensing

Optix v RGA

Summary

OPTIX – remote plasma gas analysis (RPGA) Optical method	Quadrupole Residual Gas Analyzers (RGAs)
Robust– detector separated from chemicals by optical window	Detector in contact with chemicals – easy to contaminate, hard to clean
No filaments –simple electrode geometry	Filaments and ionizers are consumables
Operates 0.5 to 10^{-7} mbar	Only operates reliably down to 10^{-4} mbar
Direct chamber monitoring – no need for differential pumping unless atmospheric sampling	Higher than 10^{-4} mbar pressure needs differential pumping – loss of sensitivity
FAST – down to 10ms data acquisition	Typically 0.5 seconds to several seconds range
Tolerates volatiles in the vacuum – hydrocarbons, solvents, long chain polymers	Only small amounts of contamination before sensor failure
Wide range of useful software applications available – gas tracking, leak detection, pump-down monitoring, water tracker, end-point detection, multi-mode process tracking	Typically gas tracking and leak detection
Sensor degassing mode – avoid false reading	Yes, but degas can affect filament lifetime

