



**PHILIPS**

Computed tomography

# Certainty lives in **layers**

Philips IQon Elite Spectral CT



Empowering  
the people  
**behind the  
image**



At Philips, we believe there's always a way to make life better—which means breaking down the silos that impede better care. When it comes to imaging, we're taking a systems approach focused on seamlessly connecting data and technology to empower the people behind the image to reach a confident diagnosis. And for Philips CT imaging, no solution integrates data and technology more seamlessly than **Philips IQon Elite Spectral CT.**

# A search for solutions

Imaging has long been tasked with finding answers. And as today's healthcare model continues to evolve, imaging is under ever-increasing pressure to find answers that will:

- **Deliver a profound clinical impact**
- **Enhance the patient experience**
- **Lower the cost of care**

What if there was one solution that could meet the needs of patients, clinicians, and administrators by providing a high level of **certainty**—diagnostically, and at every level of a medical organization?



# An answer like no other

As the world's first and only detector-based spectral technology, Philips IQon Elite Spectral CT is the only dual-energy solution that provides layers of true spectral data, without compromise.

IQon Elite represents a revolutionary solution in imaging. By enabling the right scan for each patient the first time and simplifying how data and insights are gathered, the IQon Elite helps to improve the imaging experience for patients and staff, aiding clinicians in delivering better patient care and reducing imaging costs for the organization. With Philips IQon Elite Spectral CT, [certainty lives in layers](#).

Powered by the revolutionary NanoPanel Prism detector, IQon Elite's layers of spectral data provide breakthrough solutions, including:



## **Diagnostic certainty**

Where the first exam is the right exam



## **Every scan is spectral, without compromise**

Eliminating the patient selection dilemma



## **Powerful advancements that fit your workflow**

Review and analyze spectral results—anytime, anywhere

# Diagnostic **certainty**





“With IQon, I have discovered clinical findings that were not visible before. Examples are peripheral PEs on iodine maps and lipid rich gallstones only visible on Z effective maps. The use of monoenergetic images is of real clinical utility in terms of contrast medium optimization and artifact reduction, and VNC represents a real benefit for the patient in terms of radiation dose since results are comparable to a true non-contrast image.”

**Prof. Emmanuel Coche, Director of Radiology**  
**Universite Catholique de Louvain; Louvain-la-Neuve, Belgium**

## See **beyond** conventional CT

CT is often the go-to imaging modality for a wide range of clinical indications, but conventional CT images aren't always able to provide clinicians the answers they need. Conventional CT images can present a number of challenges, including:

- Indeterminate findings
- Poor visualization of tissue
- The need for repeat scans





# Diagnostic certainty

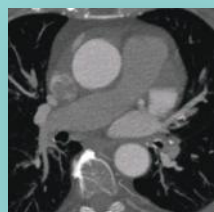
With IQon Elite Spectral CT, true conventional CT images are paired with layers of spectral results in the same scan, improving diagnostic confidence and lowering costs. Suddenly, what had been invisible is now both visible and diagnostic.

IQon Elite Spectral CT's improved tissue characterization and visualization provides diagnostic certainty **beyond that of conventional CT.**

## Rich spectral results

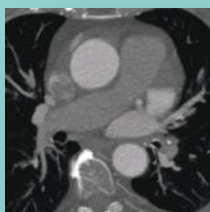
IQon delivers true conventional results paired with diagnostic layers of spectral data 100% of the time, in a single scan.

### What conventional CT provides:



Conventional CT

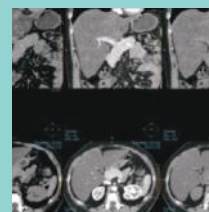
### What IQon Elite Spectral CT provides:



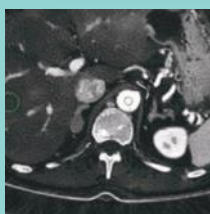
Conventional CT



Monoenergetic



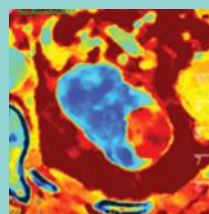
Virtual Non Contrast



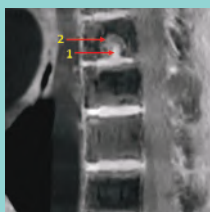
Iodine no Water



Iodine Density



Z Effective



Calcium Suppression



Electron Density

## Case study

# Faster diagnosis, fewer follow-up scans, big economical impact

CARTI Cancer Center, Little Rock, Arkansas, USA

Dual-energy CT is often used in routine examinations—from thoracic to brain, to neck and spine. Approximately 50% of these exams are performed with injections of iodinated contrast to highlight blood vessels and enhance organ or lesion structures. However, in some patients, the amount of contrast media delivered is of concern due to risk of complications, such as contrast-induced nephropathy (CIN). Efforts to reduce contrast volume in patients may reduce the risk of CIN, as well as provide institutions with clinical and economic benefits. Additionally, the ability of Monoenergetic (MonoE) spectral results from a multi-detector CT to boost iodine signal at low keV's allows for improved visualization of structures at low volumes of iodinated contrast.

A study conducted at the CARTI Cancer Center in Little Rock, AR included 60 patients with reduced renal function. Patients were separated in two groups, with one group scanned with low contrast levels on the Philips IQon Spectral CT, and the other group scanned on a different scanner without contrast.

A retrospective analysis of the 60 patients found that 30 patients who received a non-contrast CT would need additional diagnostic tests within a three-month period, adding time to diagnosis, as well as added expense of additional follow-up exams.

In comparison, utilizing the low MonoE spectral results available for those patients scanned on the IQon Spectral CT, clinicians were able to reduce time to diagnosis for these patients—as well as a reduction in follow-up exams—therefore seeing significant economic benefits.

Use of the IQon Spectral CT resulted in:



**shorter time  
to diagnosis**



**decrease in  
repeat scans**



**avg. savings per  
follow-up scan**

Clinical case example

# Address indeterminate findings

Paraspinal muscle and kidney metastasis

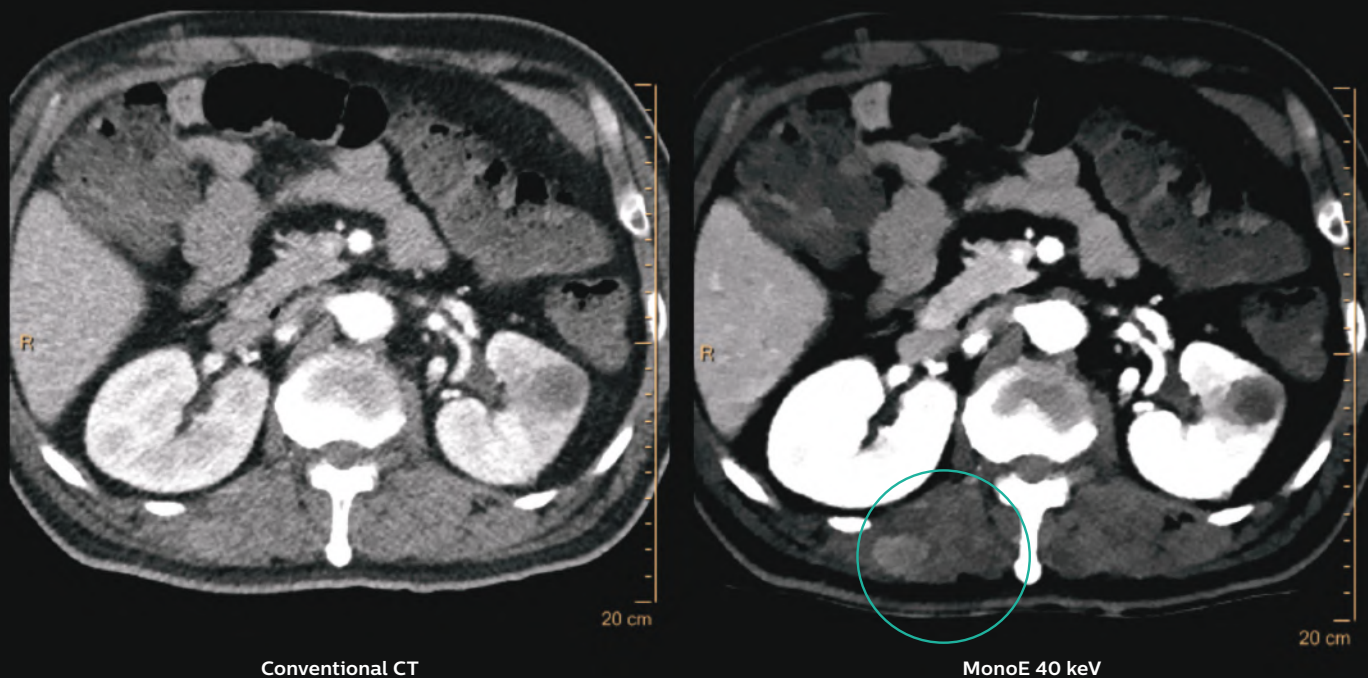
Images courtesy of Hennepin County Medical Center, Minneapolis, Minnesota, USA

## Clinical Benefit

Low MonoE images from IQon allowed for better contrast enhancement of kidney lesion and revealed a paraspinal lesion not clearly visible on conventional scans

## Case Summary

- Male patient with history of cancer complaining of pelvic pain
- Routine abdomen CT performed on IQon Spectral CT
- Conventional CT images show kidney lesion only
- Using 40 keV MonoE spectral results, clinician identified left kidney lesion, as well as a paraspinal muscle metastatic lesion not clearly visible on conventional image
- Spectral contrast enhancement of lesions helped clinician determine therapy response



Clinical case example

# Enhance visualization of tissue

Chest, abdomen, pelvis

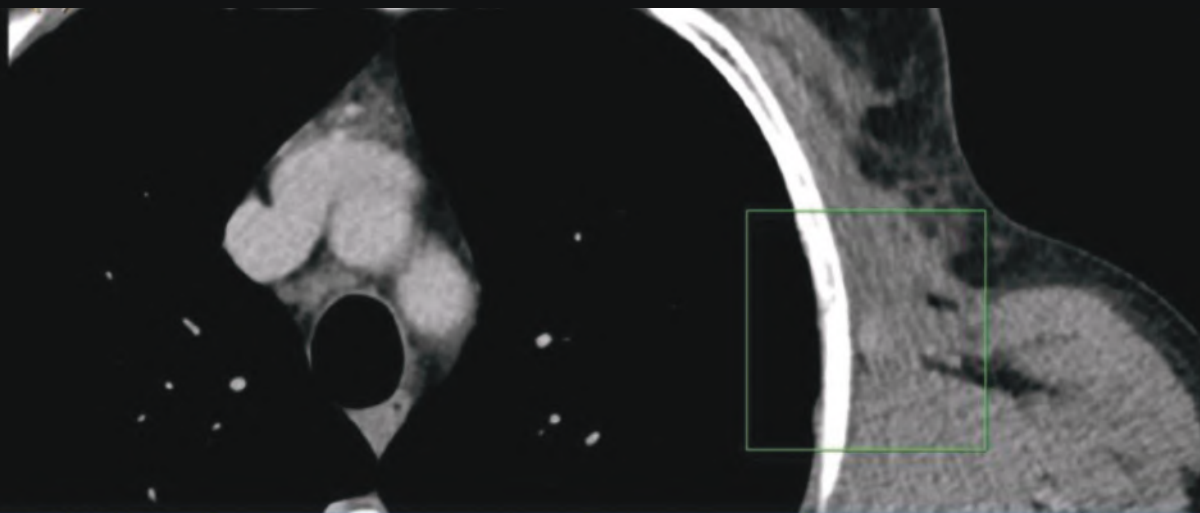
Images courtesy of University Cologne, Cologne, Germany

## Clinical Benefit

IQon's Spectral Magic Glass helped clinician identify a questionable area and evaluate a lesion

## Case Summary

- Patient with history of chondrosarcoma and who had received oncology treatments was scanned on the IQon Spectral CT for a follow-up scan at three months
- Conventional CT post-treatment read as normal
- Using Spectral Magic Glass feature, clinician was able to view multiple spectral results at the same time for a specific region of interest
- Spectral results provided clinician with visualization necessary to identify a small lesion in left axillary region



Clinical case example

# Determine next steps for treatment

Brain

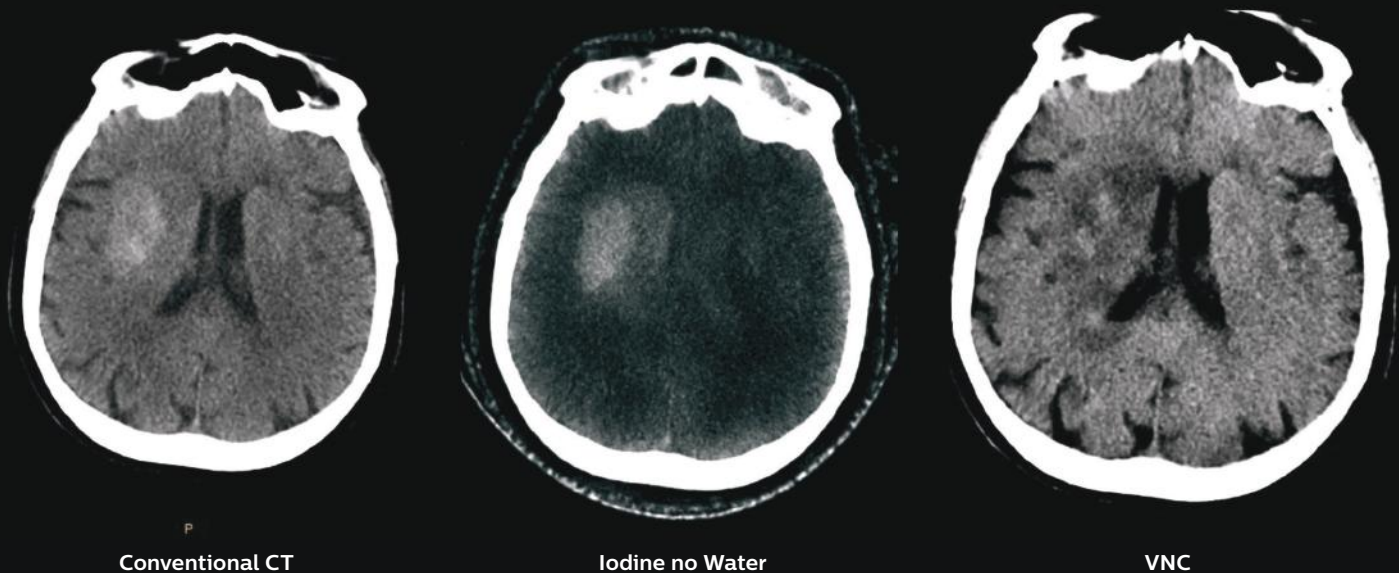
Images courtesy of Technical University Munich, Munich, Germany

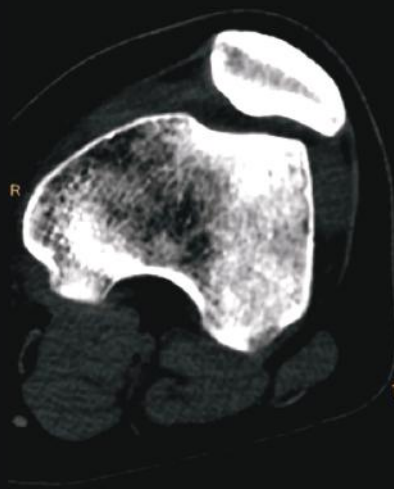
## Clinical Benefit

IQon spectral results helped neurologist determine next steps for treatment

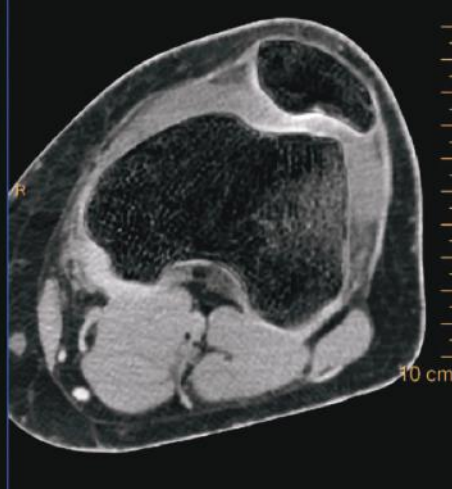
## Case Summary

- Patient was sent to the hospital for a stat interventional procedure of the brain that was followed up with a CT scan on the IQon
- On conventional CT, radiologist had difficulty determining what was blood and what was contrast due to large residual amount of contrast patient received during interventional procedure
- With IQon, clinician was able to see ghost of contrast contamination using Iodine no Water spectral result
- VNC results helped clinician visualize residual blood from an aneurysm

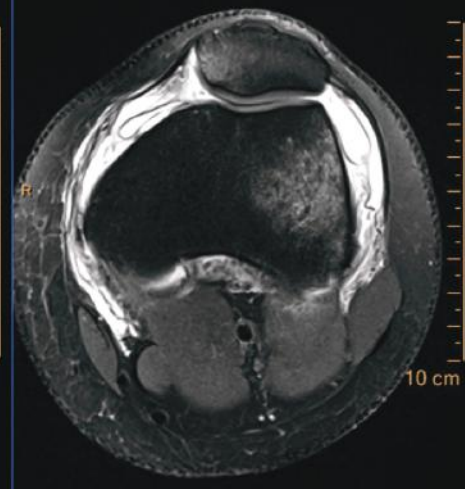




Conventional CT



Calcium Suppressed



MRI

Clinical case example

## Expand capabilities with calcium suppression

MSK knee

Images courtesy of Cliniques Universitaires St-Luc, Brussels, Belgium

### Clinical Benefit

IQon Spectral CT can help to suppress calcium and enhance a suspected area of edema

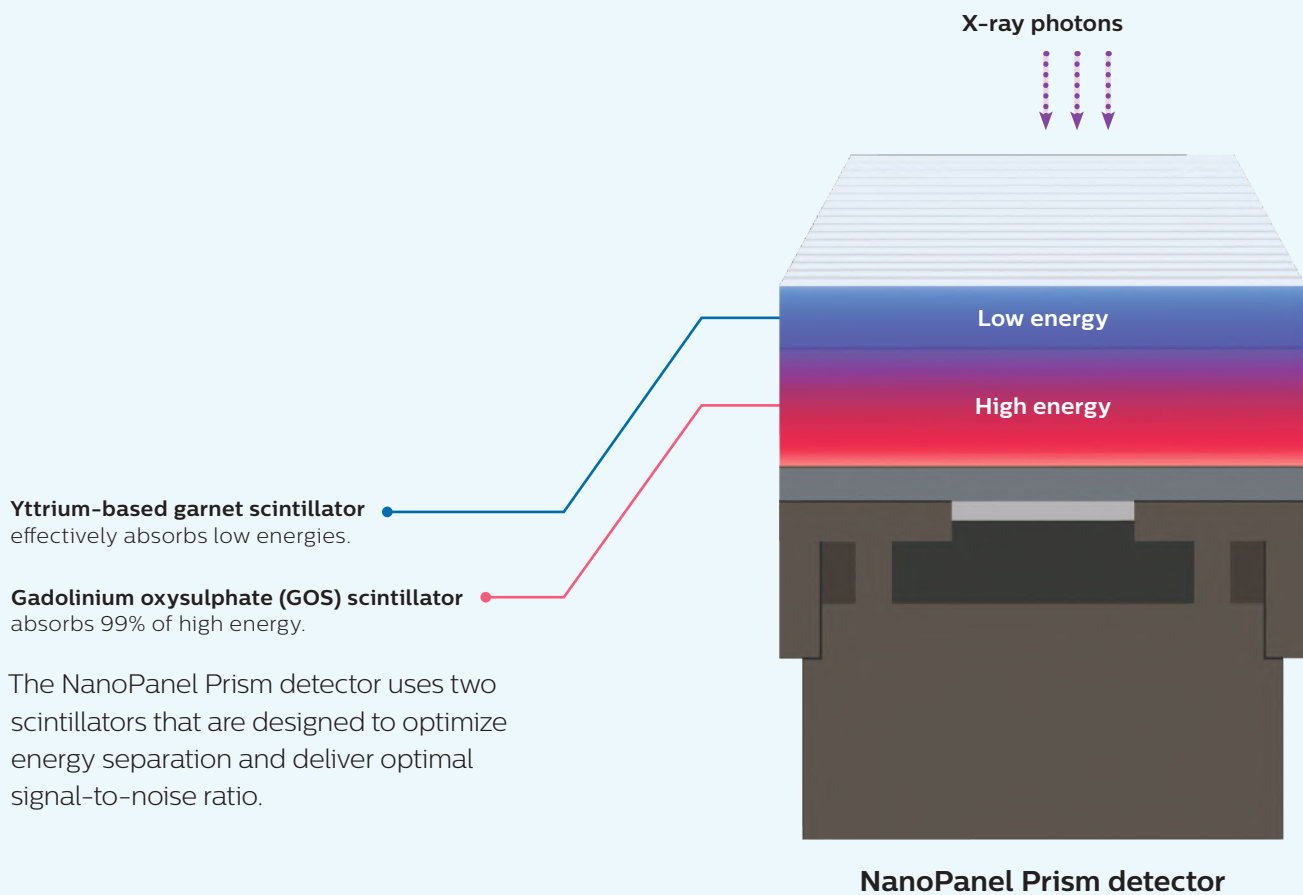
### Case Summary

- 18-year-old patient who had fallen received a CT scan to rule out a fracture
- IQon spectral results suggested a bone marrow edema
- Patient then had MRI 24 hours later to rule out any pathology
- Conventional CT scan is not typically able to demonstrate presence of bone marrow edema, which causes decreased fat and increased fluid contents within the bone marrow
- IQon Spectral CT can help to suppress calcium and enhance suspected area of edema

# The difference is detector-based

Powering the IQon Elite's unique capabilities is Philips' proprietary NanoPanel Prism spectral detector technology.

Utilizing a detector-based versus source-based system to capture spectral data, the NanoPanel Prism detector simultaneously distinguishes and captures high and low photon energy—improving visualization and characterization of tissues and structures while enhancing image quality.



A spectral CT scan of a human torso, showing various internal organs and structures. The image is color-coded, with different colors representing different energy levels or materials. The text "Every scan is spectral" is overlaid on the image.

Every  
scan is  
**spectral**





“We do not ‘pre-select’ which cases to send to the IQon. It is located in an ED setting and we send as many patients as possible to the IQon. Some days we send 135–150 scans through the IQon. We routinely discover incredible findings—with diagnostic confidence—based on the spectral reconstructions.”

**Chip Truwit, MD, Chief of Radiology**  
Hennepin County Medical Center; Minneapolis, Minnesota

## Improve the imaging experience

With source-based spectral solutions, clinicians must choose whether to perform a spectral acquisition in advance, which forces trade-offs in dose management and acquisition of true conventional images.

This creates a patient selection dilemma – if the spectral mode on a source-based scanner isn't selected up front, a patient who later would benefit from a spectral scan would require a repeat scan, which can compromise the patient experience and delay time to diagnosis and treatment. In addition, source-based solutions have inherent difficulties that compromise the acquisition of conventional CT images, affecting image quality.



# Every scan is spectral, without compromise

Only the IQon Elite Spectral CT eliminates the need for upfront spectral mode decision-making. Powered by its revolutionary NanoPanel Prism detector technology, the IQon Elite acquires spectral data at the detector rather than the source, enabling:

- Acquisition of true conventional and spectral data simultaneously, in every single scan—while maintaining full use of dose management tools
- The ability to scan a wide range of patient sizes with full spectral view

With the IQon Elite's detector-based spectral technology, there's no need to choose a spectral acquisition in advance—allowing IQon to help eliminate your pre-scan dilemma and extend the certainty of spectral data **to every patient, in every scan.**



Clinical case example

# Easily accommodate a range of patient sizes from pediatric to bariatric

Pediatric and bariatric abdomen

Pediatric images courtesy of Pheonix Children's Hospital, Phoenix, Arizona, USA

Bariatric images courtesy of University Medical Center LSU, New Orleans, Louisiana, USA

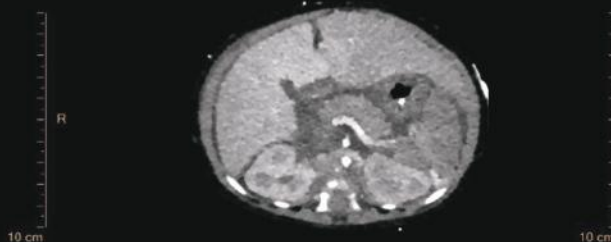
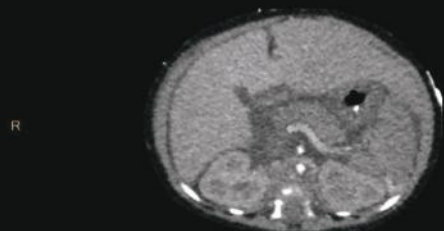
## Clinical Benefit

Ability to scan a wide range of patient types, from pediatric to bariatric

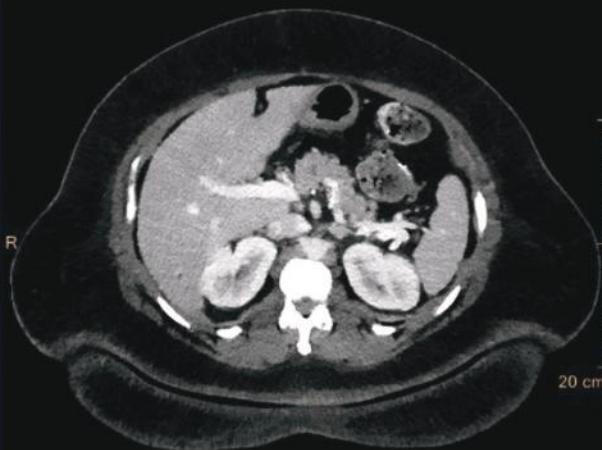
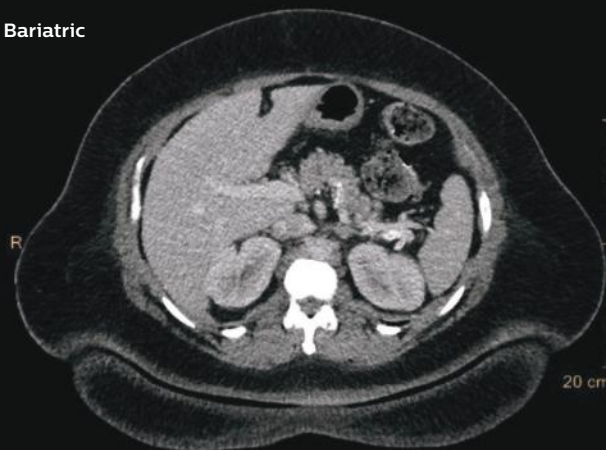
## Case Summary

- With conventional CT, limitations may exist in scanning larger patients, or achieving high image quality for smaller patients
- With IQon Elite, a wide range of patient types can be scanned, from pediatric to bariatric
- Images show scans taken on the IQon showing pediatric abdomen on a six-month old and bariatric abdomen on a patient with a BMI of 68

Pediatric



Bariatric



Conventional

MonoE 50 keV

Clinical case example

# Investigate incidental findings

Chest, abdomen, pelvis

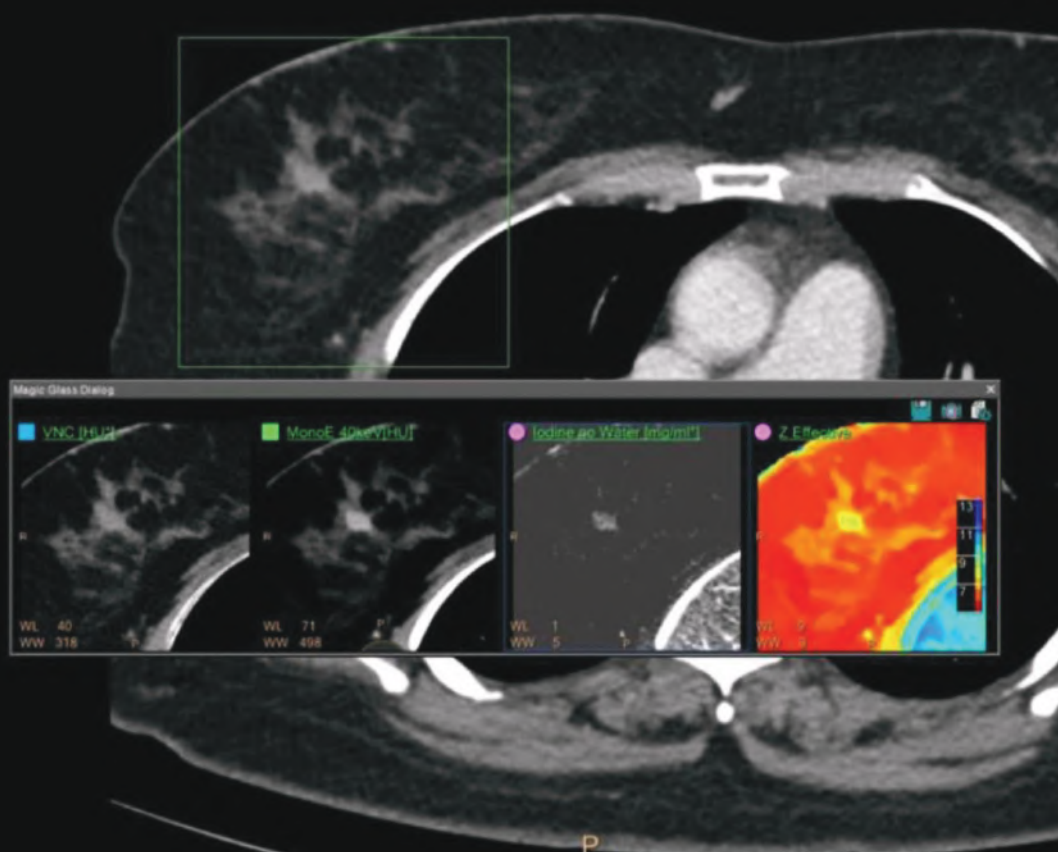
Images courtesy of UCL Brussels, Brussels, Belgium

## Clinical Benefit

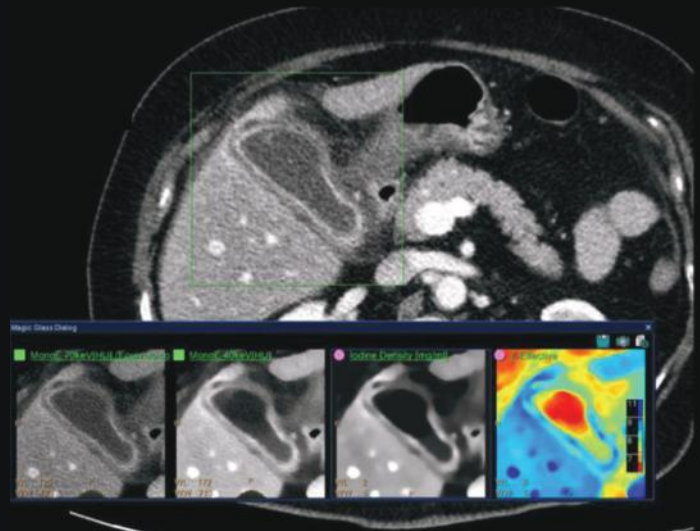
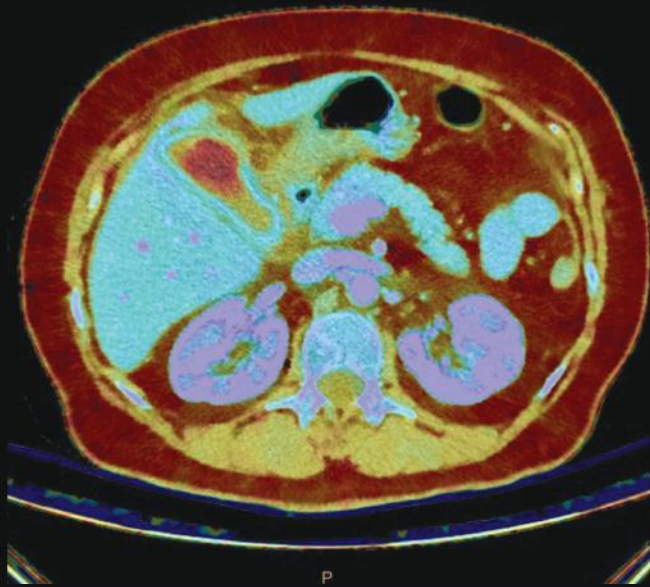
Spectral results allowed clinician to identify lesion that could have easily been missed, therefore allowing expedited patient care and treatment path management

## Case Summary

- Patient was scanned on IQon for staging of ovarian cancer
- On chest CT, clinician discovered a lesion in the right breast not easily seen on conventional CT image
- By applying Spectral Magic Glass over breast lesion area, clinician was able to determine lesion needed further analysis through a follow-up exam
- Follow-up exam tested positive for malignancy



Results from case studies are not predictive of results in other cases. Results in other cases may vary.



Clinical case example

## Reduce the need for further exams

Chest, abdomen, pelvis

Images courtesy of UCL Brussels, Brussels, Belgium

### Clinical Benefit

Z effective spectral results eliminated the need for further exams by helping the clinician identify a large cholesterol stone in the gallbladder, as well as wall ischemia

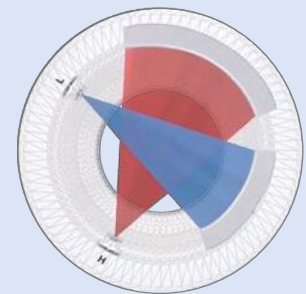
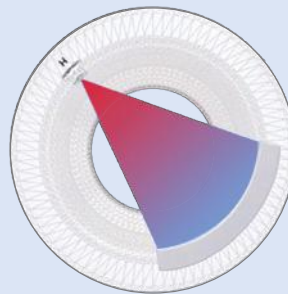
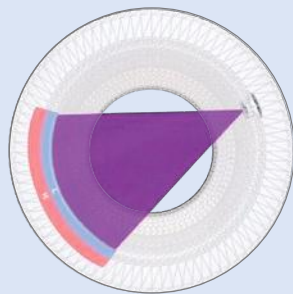
### Case Summary

- Patient presented to ED complaining of abdominal pain, and was scanned on IQon
- On conventional images, clinician noticed inflammation of the wall of gallbladder
- Using IQon spectral results, clinician was able to investigate suspicious findings without the
- need for additional exams

# Detector-based spectral is different than source-based dual-energy

IQon Elite eliminates the patient selection dilemma because every scan is spectral.

Source-based solutions rely on kVp switching between high and low kVp, or on dual-source energies at high and low kVp. Among other difficulties, kVp switching exhibits compromises in speed and with scanning larger patients. Dual-source systems demonstrate compromises in speed, field of view, and with scanning larger patients.

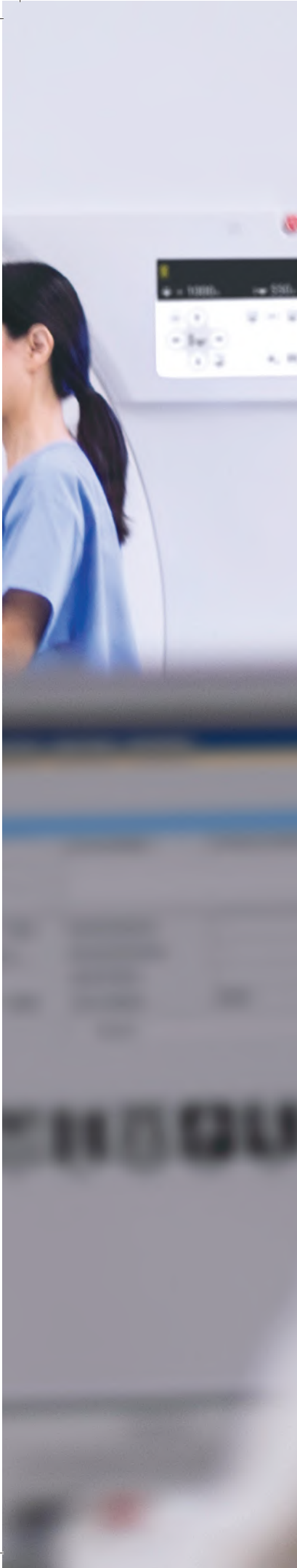


Approach	Detector-based spectral (IQon Elite Spectral CT)	Fast kVp switching	Dual-source
How it works	Detector simultaneously captures high and low energy	Fast switching between high and low kVp	Two tubes 90° apart produce energies at high and low kVp
Generating results	Spectral is always on  Eliminates the patient selection dilemma	Dual-energy mode must be preselected  Compromises in speed and for larger patients	Dual-energy mode must be preselected  Compromises in speed, field of view, and for larger patients

PHILIPS

Powerful  
advancements  
that fit your  
**workflow**





“The IQon has delivered everything it promised and more. Multi-energy CT is now constantly available and increasingly used as our norm for diagnosis. At last, a new iteration of CT has been developed with the radiologist in mind!”

**Peter Ball, MD, Radiologist**  
**Ulster Hospital; Belfast, United Kingdom**

## Make spectral routine

Some source-based dual-energy solutions come with complicated workflows and require extensive training of personnel, which can hamper the seamless adoption of spectral technology by a healthcare organization. If accessing and utilizing the data obtained in a dual-energy scan is too cumbersome to be used every day, then the technology has failed to deliver on its biggest clinical advantage—the potential to positively influence patient diagnoses and the treatment path.



# Powerful advancements that **fit your workflow**

Without the need for a separate “spectral” scanning mode or special training, IQon Elite integrates into your current workflow, allowing you to establish a new, spectral standard of care for every patient. Because every scan is spectral from the start, you can acquire and analyze spectral results as part of a routine scan and review retrospectively anytime, anywhere.

IQon Elite Spectral CT with **IntelliSpace Portal** offers a range of applications with seamless workflow, from scanning to reading the exam anywhere in the enterprise

**Spectral Magic Glass** allows for on-demand simultaneous analysis of multiple spectral results

**Spectral Magic Glass on PACS** app provides enterprise-wide spectral viewing and analysis

IQon Elite Spectral CT produces spectral results that are viewable during a routine reading, and also allows access to capabilities virtually anywhere in the organization through **enterprise-wide spectral viewing and analysis.**

Clinical case example

# Enhance visualization of vascular structures

Abdomen CTA for TAVI

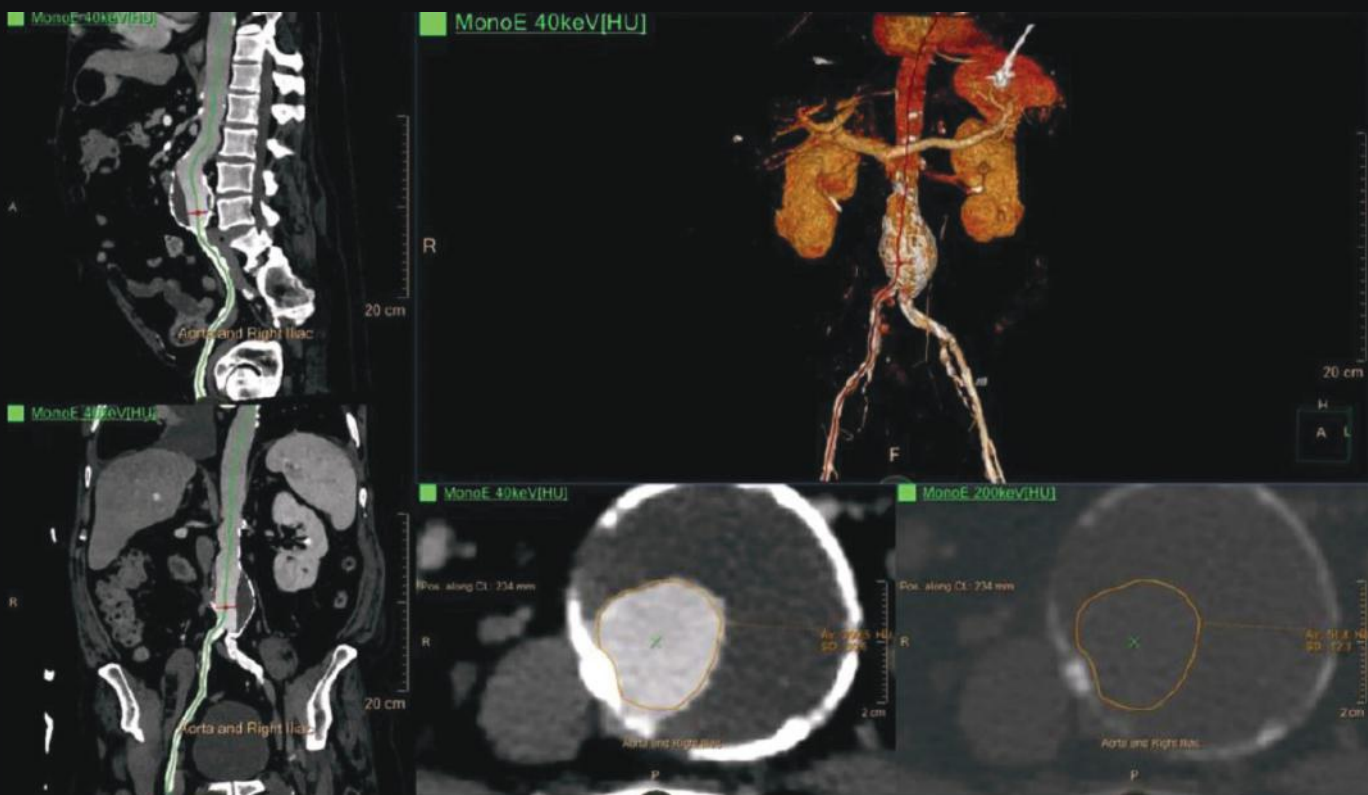
Images courtesy of University Hospitals Cleveland Medical Center, Cleveland, Ohio, USA

## Clinical Benefit

With spectral results, clinician was able to evaluate abdominal vascular structure utilizing the spectral Advanced Vessel Analysis (AVA) application

## Case Summary

- Patient was scanned on IQon to evaluate aortic valve and abdominal aorta
- 50 cc of contrast was administered to achieve scans
- Visualization of vascular structures was limited on conventional images
- Clinician lowered MonoE to improve contrast enhancement, and used spectral AVA application to better visualize and evaluate vascular structure



## Clinical case example

# Evaluate challenging cardiac cases

## Cardiac

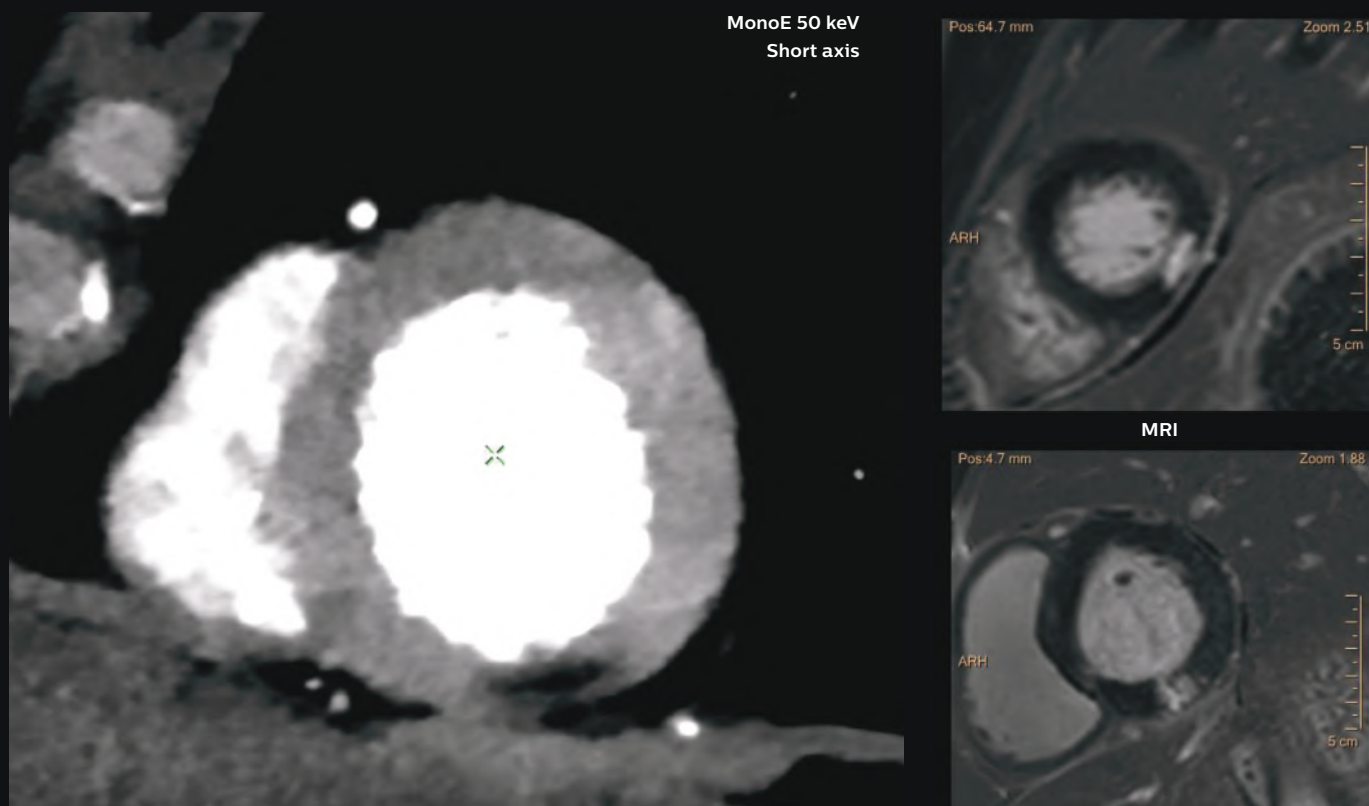
Images courtesy of University Medical Center LSU, New Orleans, Louisiana, USA

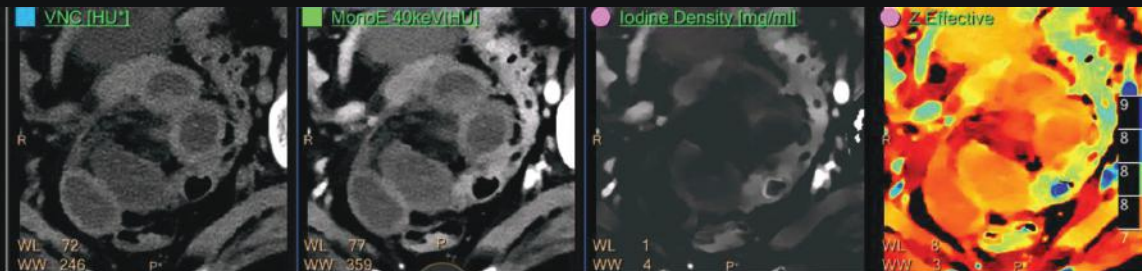
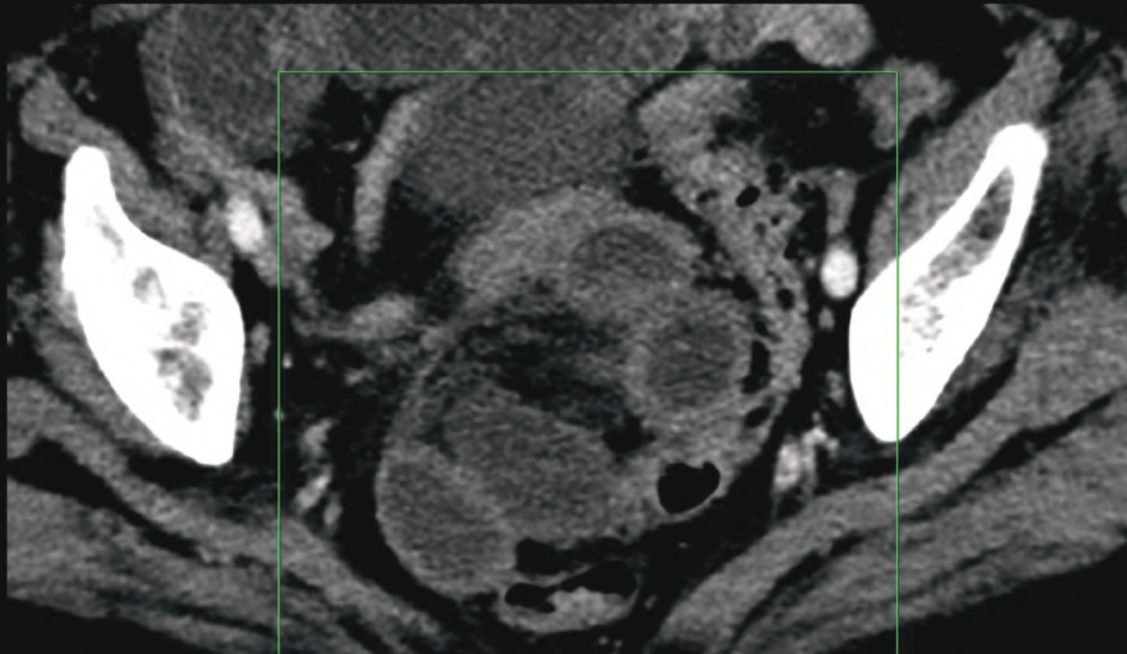
### Clinical Benefit

Gated spectral cardiac capabilities allowed clinician to review spectral cardiac anatomy immediately post-scan. Spectral Comprehensive Cardiac Analysis (CCA) software provided clinician with the ability to evaluate the short axis.

### Case Summary

- Young male patient admitted to hospital for atypical chest pain
- EKG showed suspected inferior wall infarction, and lab work showed elevated troponins
- Although a younger patient, myocarditis was a suspected diagnosis
- On conventional CT image, gated cardiac CTA showed normal coronary arteries
- However, clinician noticed a suspicious area questionable for an infarct in the inferior wall of the myocardium
- Gated spectral cardiac capabilities allowed clinician to review the spectral cardiac anatomy immediately post-scan
- Spectral CCA software provided the clinician with the ability to evaluate the short axis





Clinical case example

# Improve patient care through early detection

Abdomen, pelvis

Images courtesy of CHU L Pradel, Lyon, France

## Clinical Benefit

A single scan provided the radiologist with enough data to help in early detection that improved patient care.

## Case Summary

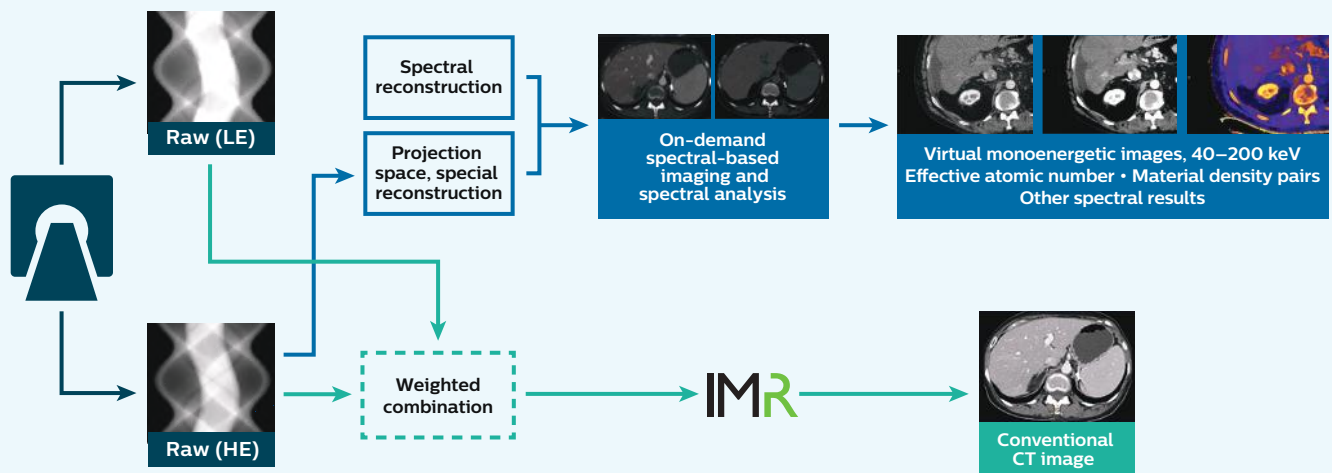
- Elderly female with history of abdominal pain was scanned on IQon for questionable diverticulitis
- No signs of bowel wall ischemia were identified on conventional images
- This helped clinician rule out diverticulitis, but clinician saw signs of ileus
- Using virtual noncontrast and Iodine no Water spectral results, clinician identified an intramural hematoma in areas of the small bowel

# Why scanning and reconstruction work so well

The IQon Elite's projection space spectral reconstruction enables spectral results with no additional reconstruction or post-processing, so multiple spectral results can be reviewed and analyzed on demand.

## Projection space spectral reconstruction

Projection space spectral reconstruction provides a single DICOM entity, known as Spectral Base Image (SBI), that contains sufficient information for retrospective analysis. Spectral applications create various high quality spectral results from the SBI.





## Integrated solutions from the start

The Philips portfolio of solutions and services helps you realize the full potential of spectral imaging—while potentially reducing operational costs and making it easy and more cost-effective to keep your technology up-to-date.





Low-dose solutions such as Philips **DoseWise** deliver on quality measures, while allowing you to experience all the benefits of spectral data at the same dose levels as a conventional CT scan.



**PerformanceBridge** offers an integrated portfolio of services and solutions that enables continuous organizational performance improvements.



**Asset management** to help you manage, monitor, and control clinical assets across our healthcare system.



Updates and upgrades through **SmartPath**, a robust portfolio that delivers expanded clinical capabilities and important workflow efficiency gains.



**TechMaximizer** allows for technology migration to ensure you are using the most up-to-date hardware and software, while reducing the costs of managing obsolescence.



With **remote services and proactive monitoring**, Philips helps you solve problems 24/7 before they can impact your day-to-day operations.



**NetForum Community** brings healthcare professionals together online to share best practices, leverage experience, and optimize system performance.

# The detector is the difference

The revolutionary NanoPanel Prism detector eliminates the compromises associated with other dual-energy techniques—to deliver spectral insights for every patient, in every scan.

## Diagnostic certainty

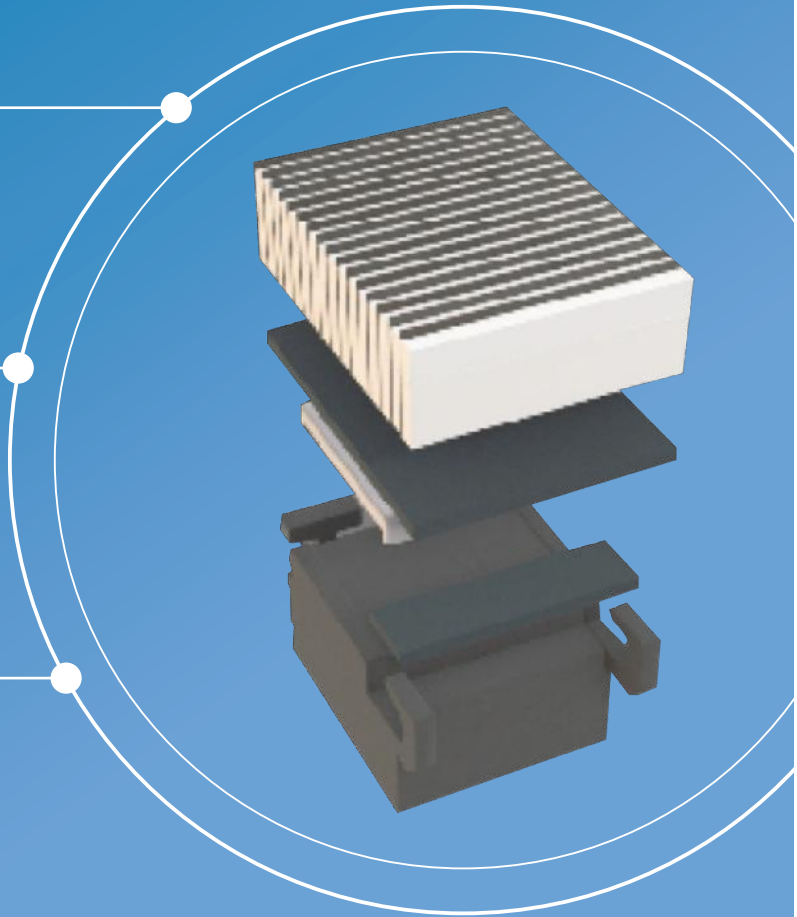
The unique dual-layer detector distinguishes high- and low-energy data simultaneously, reducing scanning time and improving data integrity.

## Every scan is spectral, without compromise

The detector-based solution introduces a unique scanning and clinical application experience, without the pre-decisions required for source-based solutions.

## Powerful advancements that fit your workflow

Projection space spectral reconstruction enables spectral results with no additional reconstruction or post-processing.



100% of organizations agreed with the following statement: **“IQon Spectral CT has increased my confidence in diagnosis.”\***

\*Source: TechValidate survey of 27 customers of IQon Spectral CT  
Published: Apr. 24, 2018. TVID:OEB-5FB-539

# Unlock the full potential of a spectral solution

Acquire the right image and the right insights for each patient, in the first exam.

Improve imaging outcomes and enhance the patient experience—while lowering the cost of care.

With IQon Elite Spectral CT, your organization can leverage the technological innovation of spectral detection to:

- **Achieve diagnostic certainty**
- **Acquire spectral data in every scan, without compromise**
- **Harness powerful advancements that fit your current workflow**

Which ultimately means enhanced confidence for your staff, an improved experience for your patients, a simplified process to gather data and insights, and reduced costs for your organization. All through the transformative power of spectral.

**With Philips IQon Elite Spectral CT, certainty lives in layers.**





*The IQon Spectral CT is a Computed Tomography X-Ray System intended to produce cross-sectional images of the body by computer reconstruction of X-ray transmission data taken at different angles and planes. This device may include signal analysis and display equipment, patient and equipment supports, component parts, and accessories.*

*The IQon Spectral CT system acquires one CT dataset – composed of data from a higher-energy detected X-ray spectrum and a lower-energy detected X-ray spectrum. The two spectra may be used to analyze the differences in the energy dependence of the attenuation coefficient of different materials. This allows for the generation of images at energies selected from the available spectrum and to provide information about the chemical composition of the body materials and/or contrast agents. Additionally, materials analysis provides for the quantification and graphical display of attenuation, material density, and effective atomic number. This information may be used by a trained healthcare professional as a diagnostic tool for the visualization and analysis of anatomical and pathological structures.*

*The images and descriptions contained herein provide technical specifications and optional features which may not be included with the standard system configuration. Contact your local Philips Representative for complete specific system details.*

*Some or all of the products, features, and accessories shown or described herein may not be available in your market. Please contact your local Philips Representative for availability.*

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