FONDAZIONE BRUNO KESSLER
MAGAZINE

What do a cabbage, a diamond and the mountains of Trentino have in common?

May 26, 2025

Elia Scattolo and Alessandro Cian bring Speck&Tech into the Foundation's Clean Room.

What do a cabbage, a diamond, and the mountains of Trentino have in common? Seemingly nothing. But in reality, they are all examples of how nature, science, and technology intertwine in surprising ways—often invisible to the naked eye. We discovered this during **Speck&Tech #75**, an event that took the audience on a journey into the world of **Clean Rooms** and **nanotechnologies**.

The stars of the evening were Alessandro Cian and Elia Scattolo, researchers at the **Center for Sensors & Devices** **at FBK** (Fondazione Bruno Kessler), who described the role of Clean Rooms in the development of cutting-edge devices and materials that are increasingly present in our everyday lives.

From breath to the environment: understanding the world through MOX sensors



When you say Trentino, you think of nature, mountains, innovation… and ‘nanothings,’” began **Alessandro Cian**, a researcher in the Micro Nano Facility unit and Science Ambassador at FBK. Through a journey that combined technology and the local area, he explained how tiny devices—gas sensors—are used to monitor air quality, industrial emissions, and vital signs. Made with semiconductor materials, MOX (Metal Oxide Semiconductor) gas sensors change their electrical resistance in the presence of specific gases, producing a measurable signal. Applications? From home carbon monoxide detectors to precision agriculture tools and breath monitoring in medical devices. Thanks to nanofabrication processes developed in the Clean Room by the gas sensing group led by Andrea Gaiardo, these sensors are becoming increasingly small, integrated, and smart. Invisible to the human eye, yet essential for interpreting the world around us.



Elia Scattolo, a researcher in the Micro Nano Facility unit, guided the audience through another universe: **natural nanostructures** and **quantum materials**. His talk, titled “Cabbages and Diamonds: Beyond Nanotechnologies,” revealed how plants, animals, and ancient works of art are unsuspecting masters of nanotechnology.

Cabbage leaves? Examples of superhydrophobic surfaces. Gecko feet? Masterpieces of adhesion. Diamonds? Not just a precious gem, but an ideal platform for developing quantum sensors and devices, thanks to so-called color centers—nano-defects in the crystal structure that emit visible light.

These technologies are also studied and developed within FBK’s Clean Rooms and open up possibilities ranging from quantum cryptography to quantum sensing, advanced microscopy, single-photon generation.

This edition of **Speck&Tech**, organized in collaboration with the HIT Foundation, didn't take place inside a Clean Room—for understandable reasons related to access and contamination—but it offered the public a rare insight into the work and innovations being developed within such controlled environments.



PERMALINK

https://magazine.fbk.eu/en/news/cosa-accomuna-una-verza-un-diamante-e-le-montagne-del-trentino/

TAGS

- #ambassador
- #cleanroom
- #dispositivi quantistici
- #fbkscienceambassador
- #mox
- #nanotecnologie
- #quantistica
- #quantum

- #semiconduttori
- #sensori
- #sensoridispositivi

AUTHORS

- Michela Antino