

E-SQUID

Development of SQUID-based multiplexers for large Infrared-to-X-ray imaging detector arrays in astronomical research from space

LOOKING BACK TO THE BEGINNING OF TIME

Looking back into the earliest stages of the Universe, X-ray sensing devices working at temperatures close to absolute zero are indispensable. The E-SQUID project will take Europe to the top in this critical technology domain.

Present astrophysics research focuses on solving the mysterious past and evolution of the Universe, which can be traced by observations of the most distant and faintest objects in the sky. Mission plans seek X-ray sensing devices that can detect the details of the faint glow of the first black holes and the very hot gas in the early Universe after the Big Bang, and the infrared light of cool

objects in outer space, which human made devices have not been able to detect before. For both of these focus areas of modern astronomy, detectors operated at temperatures near absolute zero are by far the only choice fulfilling the requirements of science. For such detectors, the best readout solution is SQUID – the Superconducting Quantum Interference Device.

This has been recognized by developers of high sensitivity cameras for astronomy and other applications all over the world, and a lot of effort is put on squeezing the ultimate performance from such devices. Presently, the European level of expertise is also advanced in this area of critical technology, but is not yet the state-of-the-art in the world. The goal of E-SQUID is to make progress in this area by utilising the best European expertise, and bridge the gap to reach the top.

The practical task includes developing first prototypes of SQUID readout of small image arrays in the required wavelengths with the highest possible signal-to-noise ratio, and then scaling-up the size by methods that allow further upgrades to megapixel size in the future.



JUHANI HUOVELIN
IS PROJECT COORDINATOR



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E-SQUID will develop an improved SQUID-based readout suitable for large X-ray to Infrared detector arrays in space research.

QUESTIONS & ANSWERS

What do you want to achieve with this project?

We want to develop detector arrays with SQUID readout which perform measurements with the best achievable sensitivity. Applicability for various wavelengths in both space and Earth-based applications, and scalability to large array sizes are our other goals.

Why is this project important for Europe?

This project conducts research and technology development creating collaboration between the best experts in Europe in this critical technology area. It also improves Europe's competitiveness in the global technology market, and enhances the technological independence of Europe.

How does your work benefit European citizens?

Direct benefits to European citizens include improved high technology products, applications and services which will be developed within the EU. Indirect benefits include better employment via better competitiveness of European industry, spreading widely beyond this technology area.

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LIST OF PARTNERS

- University of Helsinki, Finland
- University of Leicester, United Kingdom
- SRON, The Netherlands
- MPG, Germany
- VTT, Finland
- IPHT, Germany
- Aivon Oy, Finland
- Supracon AG, Germany

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PROJECT INFORMATION

Development of SQUID-based multiplexers for large Infrared-to-X-ray imaging detector arrays in astronomical research from space (E-SQUID)

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