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### Pressemitteilung

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### Universität Stuttgart

## Students launch ferrofluid experiment in sounding rocket - Improving future space technologies with magnetic fluid

The REXUS sounding rocket will be launched from the European spaceport in Sweden between March 10 and 15, 2025. Once again, two ferrofluid experiments by students from the University of Stuttgart will be on board. Their mission is to explore how ferrofluid-based technologies perform in weightless conditions and withstand extreme forces and temperatures. The use of magnetic fluid is intended to improve technologies for space travel.

PAPELL, FARGO, FerrAS and FINIX - the gallery of ferrofluid experiments powered by KSat is filling up. Once again this year, the Small Satellite Group at the University of Stuttgart (KSat e.V.) has secured a place on board the REXUS sounding rocket. With FINIX (Ferrofluid Implementations for Next generatIon eXploration), the students want to find out how magnetic fluids can make future space technologies less maintenance-intensive and more sustainable.

Making space technologies more durable

"Instead of mechanical components, such as switches and pistons, we use ferrofluid," explains Yolantha Remane, System Engineer at KSat. Ferrofluid, an oily liquid containing iron oxide, can be moved in any pattern and thus implement switching or pumping movements, for example. The advantage: "Ferrofluid minimizes wear in technical systems, allowing for longer operation with reduced resource consumption."

FINIX tests ferrofluid pump and switch

With FINIX, the students are testing a pumping and switching system based on ferrofluid. The pump consists of two coils and a permanent magnet that acts as a piston. In combination with ferrofluid, for example, the system could pump coolant into spacecraft.

The students have further developed and optimized the electrical switch based on past experiments, including on the ISS. The idea is to open and close a circuit using droplets of ferrofluid and liquid metal. "With FINIX, we aim to test whether the switch can better withstand space conditions through optimized magnetic field geometries and advanced manufacturing processes," says Yolantha Remane.

### Ready for take-off

FINIX has already undergone several short test runs. In Bremen, all participating university groups gathered for a shaker test to evaluate the experiment module under extreme forces. "We are well on course and ready to get on board with FINIX," says project manager Johannes Schubert.

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On March 3, KSat traveled to Sweden for the final preparations. FINIX and seven other student experiments will be launched on the REXUS sounding rocket from the European spaceport in Esrange between March 10 and 15. At an altitude of approximately 90 kilometers, the students have just a three-minute window to test FINIX in zero gravity. "When we start depends on several factors, but above all on the weather," explains Johannes Schubert. One thing is certain: "The excitement builds right up until the very last moment before launch."

The KSat students will be reporting live from Sweden on the University of Stuttgart's Instagram channel on launch day.

#### wissenschaftliche Ansprechpartner:

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The team traveled to Sweden to prepare FINIX for launch between March 10 and 15, 2025. KSat e.V.

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The FINIX experiment integrated into the REXUS module, ready for launch. KSat e.V.