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DURHAM, N.H. -- Scientists Eberhard Möbius and Marty Lee of the University of New Hampshire's Space Science Center have been selected by NASA to help build instruments for a mission characterized as the "first step beyond the solar system and into the galactic frontier."

As part of NASA's Interstellar Boundary Explorer, or IBEX, mission, Möbius, Lee and a team of engineers, scientists and students at UNH will construct critical components of the special cameras on board the IBEX spacecraft.

The two, ultra-high sensitivity cameras will produce images of the region in space where the solar wind interacts with the interstellar medium by capturing atoms that fly on a straight path toward Earth. Because they turn incoming atoms into an image, the cameras could be compared to the special visors worn by the blind Geordi in Star Trek: The Next Generation. UNH will contribute the optics for both cameras and the "time-of-flight" sensor system, which determines the mass of captured atoms, for one of the cameras.

IBEX is a new mission in NASA's Small Explorer Program, which provides frequent flight opportunities for highly focused and relatively inexpensive space science missions. The mission is being led by Dave McComas of the Southwest Research Institute in San Antonio, Tx., and has a total price tag of $134 million.

The region in space IBEX will probe marks the boundary between Earth's solar system and the rest of Earth's galaxy. Fifty years of space exploration has provided a good understanding of near-Earth space, and instruments such as the Hubble Space Telescope have provided beautiful glimpses into deep space. But the region where Earth's solar system mingles with the medium that fills Earth's galaxy – the "space" between the stars – has not been well investigated. And this, according to Möbius, is largely because of a lack of instrumentation to do the job.

"This mission really tackles a new measurement that we could not do before," says Möbius who, like Lee, is a professor of space plasma physics at the UNH Institute for the Study or Earth, Oceans, and Space (EOS) and the Department of Physics. Although UNH has built similar components for other space missions, this next generation of high-sensitivity cameras will keep the IBEX team on their toes improving the technology in a very short timeframe.

"We are using a known technique but we are pushing it to its limits," Möbius says. For example,

to build the optical component – called a collimator, which will "focus" the incoming particles – the UNH team will need to do significant design and development work as well as very advanced engineering.

"Because we only want to get neutral particles, we will have to repel all charged particles, which means we will have to put the collimator on very high voltage," he says. And, with respect to the design and engineering, he says, "this is a whole different kettle of fish we have to deal with here."

To get the distance of the region imaged by IBEX, the mission will involve the Voyager 1 spacecraft, which was launched in 1977 and is heading out of Earth's solar system. When Voyager 1 punches through the region separating Earthh's solar system from interstellar space, the cameras on board IBEX should be able to pinpoint the exact point of exit.

"We are very proud of the IBEX team. And this is very much a team effort, with our partners Southwest Research Institute, our team captain, Lockheed Martin, the Los Almos National Laboratory, NASA's Goddard Space Flight Center, the Applied Physics Laboratory, Orbital Sciences, and the University of Bern. We are also very excited to involve our students, both undergraduate and graduate, in this cutting-edge science," says Berrien Moore III, director of EOS,

In addition to UNH's work, the Christa McAullife Planetarium in collaboration with the Adler Planetarium in Chicago, will participate in the IBEX education and public outreach effort through the creation of a planetarium show.