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ATLANTA—Georgia State University's Center for High Angular Resolution Astronomy (CHARA) in Mount Wilson, Calif., has been awarded $2.5 million from the National Science Foundation's Major Research Instrumentation (MRI) Program to support a new mobile telescope to the CHARA Array, the largest optical interferometer in the world.

The NSF has also committed to continue support for CHARA's open-access program for guest observers. A three-year, $4.6 million grant is set to begin in September 2021 and will allow scientists from across the globe to access the telescope array for research.

"As a unique facility, the CHARA Array offers new science opportunities and demand for time on the Array is very high," said Gail Schaefer, research scientist at CHARA. "Since the inception of the community-access program in 2016, almost 300 astronomers from across the U.S. and around the world have applied for time."

The Array's six telescopes, spread out across the mountain, combine to simulate a single instrument, creating the world's most detailed, high-resolution view of the stars. Using the $2.5 million grant, the center will add a seventh mobile telescope, increasing the array's magnifying power. Theo ten Brummelaar, director of the CHARA Array, says construction of the new telescope should be complete by 2023.

CHARA's telescopes are positioned over Mount Wilson to offer the resolving capability of one large telescope with a diameter of about one fifth of a mile. By sending starlight to a central beam-combining laboratory, astronomers can measure the size and shapes of stars and map the orbits of stellar companions. They can also catch stars in the process of formation and resolve disks of gas and dust around young stars where planets form. CHARA has created the first images of starspots on the surfaces of nearby stars, documented the exploding fireball stage of a nova, captured a rare stellar eclipse by companion star, and demonstrated that rapidly rotating stars are bulged and cooler at the equator and flattened and hotter at the poles.

"This new telescope will allow us to increase the Array's diameter to over one kilometer and provide the highest resolution of any instrument in the world," ten Brummelaar said.

The CHARA Array, which is operated by the Department of Physics and Astronomy, plays a key role in teaching scientists and students at Georgia State and other universities worldwide. The open-access program partners with five other schools to give researchers access to the center, and Georgia State has awarded 18 doctorates to students who conducted graduate research there.

"We now offer 60 nights per year to guest observers. With the new grant, we expect to expand community access to up to 100 nights per year," Schaefer said.