'Assassin' targets supernovae in our neighborhood of the universe

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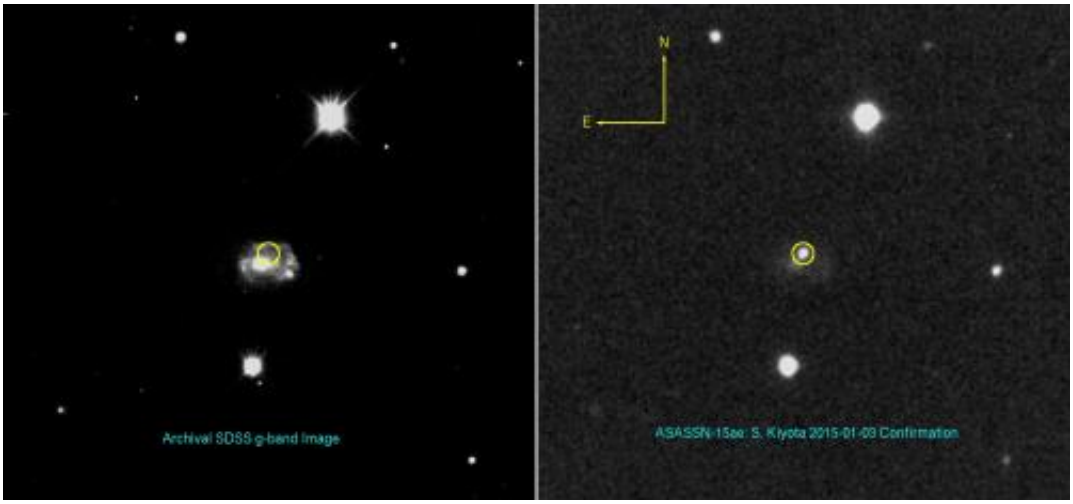

On the left is a Sloan Digital Sky Survey archival image of a galaxy some 400 million light years away in which the All-Sky Automated Survey for Supernovae (ASAS-SN, pronounced 'assassin') detected a bright supernova on Jan. 3, 2015. On the right is an image submitted by ASAS-SN amateur contributor Seiichiro Kiyota of the Variable Star Observers League in Japan, which confirmed the existence of the supernova. Credit: ASAS-SN / The Ohio State University

While many astronomical collaborations use powerful telescopes to target individual objects in the distant universe, a new project at The Ohio State University is doing something radically different: using small telescopes to study a growing portion of the nearby universe all at once.

The strategy is paying off. At the American Astronomical Society (AAS)

meeting in Seattle this week, researchers reported early successes from the All-Sky Automated Survey for Supernovae (ASAS-SN, pronounced "assassin").

Since it officially launched in May 2014, ASAS-SN has detected 89 bright supernovae and counting—more than all other professional astronomical surveys combined.

Right now, the survey consists of six 6-inch telescopes—four in Hawaii and two in Chile—and a cadre of telescopes volunteered by amateurs around the world. Two additional telescopes are set to go online early in 2015. And because the survey is capturing hundreds of other bright, local objects in addition to supernovae, Ohio State researchers are about to launch a series of spin-off projects, each geared to serve the growing interests of amateurs and professional astronomers alike.

ASAS-SN covers the nearest 500 million light years around the Milky Way Galaxy—about 1 percent of the observable universe, the edge of which is more than 46 billion light years away.

"It's natural to be interested in our local neighborhood. This is where we live, this is where the action is," said Krzysztof Stanek, professor of astronomy at Ohio State.

"ASAS-SN is the only survey to study the local universe. Our early success proves that small telescopes can do big things, and the interest we've received from the astronomical community has quickly grown to the point that we need additional projects to cover other types of detection events besides supernovae."

In particular, ASAS-SN has spotted more than 250 cataclysmic variables—stars that vary dramatically in brightness. At AAS, Ohio State doctoral student A. Bianca Danilet announced the launch of an ASAS-

SN offshoot called the CV Patrol, which will track cataclysmic variable data from small telescopes online and in real time.

"This approach to looking at the nearby universe is proving successful in part because it's affordable, utilizes the efforts of highly motivated citizen scientists, and has the global reach necessary to spot these events and track them. It also just may provide information about the physics of these bright and transient phenomena that far-seeing telescopes cannot," Danilet said.

Doctoral student Thomas Holoien agreed, adding that big telescopes are too sensitive to capture details of bright, nearby events. In that way, ASAS-SN complements the efforts of the big surveys. "We pick up where they leave off," he said.

Aside from cataclysmic variables, ASAS-SN has picked up two nearby tidal disruption events—extremely rare sightings of what happens when a black hole captures a portion of a nearby star—and many M dwarf flares, which are believed to emanate from stars with extremely strong magnetic fields.

Even though all these bright events happen in our local neighborhood, nobody is sure exactly how often they occur, said Christopher Kochanek, professor of astronomy at Ohio State and the Ohio Eminent Scholar in Observational Cosmology. ASAS-SN gives astronomers a chance to learn more about these events by seeing them up close.

Because ASAS-SN discoveries are made public online (at http://www.astronomy.ohio-state.edu/~assassin/), amateur astronomers can follow along and contribute. Stanek said that the volunteers have already formed a growing and active community, in part because amateurs who are able to submit an image confirming an ASAS-SN supernova are awarded co-authorship on any journal papers that result.

Provided by The Ohio State University