

Comet ISON May Sizzle Or Fizzle This Fall

BY CYNTHIA DIZIKES

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CHICAGO — When Adler Planetarium astronomer Mark Hammergren first heard the buzz about comet ISON last fall, he felt a familiar tinge of excitement.

The brightest comet in the last century. As vivid as a full moon in the night sky over Chicago. A once-in-a-lifetime, blazing spectacle.

But as ISON zips closer to Earth's orbit, the hunk of ice and dust has done something typically cometary: upended expectations.

Compared with original estimates, ISON is already dimmer than expected, reviving bitter memories of the "great" comet Kohoutek. Hyped in 1973 as the comet of that century, Kohoutek fizzled into an unspectacular dud above the southern horizon.

Hammergren, who was a kid at the time, recalled being led outside after sunset to view the comet. But instead of a brilliant tail of gas and debris lashing the night sky, all Hammergren saw were contrails.

"There is a great saying about comets being like cats," Hammergren said. "They both have tails and they do what they want."

Indeed, the annals of astronomy are streaked by unexpected comet burnouts and breakups, but also surprising outbursts like the 2007 brightening of comet Holmes. In October of that year, the normally faint comet briefly ballooned into the largest object in the solar system when gases erupting from its surface expanded to a diameter greater than that of the sun.

Given the uncertainty, Audrey Fischer, a director of the Chicago Astronomical Society, said "every one of us is holding our breath."

Although the society has already begun to plan viewings, astronomers at the Adler and other observatories are taking a wait-and-see approach, ready to stage events if ISON should suddenly brighten or public interest spikes.

Comet ISON was first spotted in September 2012 by scientists working with the International Scientific Optical Network, or ISON for short. At that time, the comet was unexpectedly bright for being so far away, fueling speculation that it would grow to record-breaking radiance by the time it swung around the sun in late November.

For now, ISON can be seen in the Northern Hemisphere through a powerful telescope — a faint smudge in the constellation of Cancer about 183 million miles away from the sun, said astronomer and Northwestern University lecturer Michael Smutko.

"If you are up in the early morning hours, and you know where to (point your telescope), you can see it from Chicago," said Smutko, who has not yet been inspired to partake in a pre-dawn viewing.

By November, however, Smutko hopes that could change. ISON is expected to make the celestial equivalent of a flyby when it passes 730,000 miles above the sun's surface on Nov. 28.

Around that time and into December, astronomers anticipate that ISON will become visible to the naked eye, burning low in the eastern sky.

"It does not look like it is going to reach full-moon brightness, but maybe Venus brightness — brightest star in the night sky," Smutko said. "It should still put on a decent show."

Exactly how bright ISON will become, how wide and long it will grow, and whether it will put on a strictly suburban show remain unknowns.

ISON is currently speeding through the cosmos at roughly 67,000 mph and is expected to accelerate to about 844,000 mph as it swings around the sun. But because ISON and other comets are so far away from Earth, unlike meteors, they appear relatively static in the sky.

Comets are huge chunks of ice, frozen gases, dust and rock, a makeup that gave rise in the 1950s to the so-called dirty snowball model.

As comets fall closer to the sun, heat vaporizes the ice, releasing plumes of gas and dust. Sunlight reflects off that debris, illuminating the comet — a word derived from the Greek word meaning "hair of the head."

Particularly bright comets are dubbed "great comets" and have typically appeared about once every 10 years.

The last truly great Northern Hemisphere comet, according to many astronomers, was Hale-Bopp, which was first spotted in 1995 and eventually remained visible for a record 18 months.

"It became quite a commonplace sight," Hammergren recalled. "Even to myself, as a graduate student in astronomy at the time, I would be leaving work and look up and say, 'Ah, there's the comet again.'"

A comet's brightness depends on how close it passes to Earth and the sun. But it also comes down to size and composition, making predictions tricky.

Hale-Bopp's core was estimated to be about 25 miles across. ISON's has been pegged at roughly 3 miles. Comet Holmes' core, meanwhile, is thought to be about 2.

In general, the more ice and gases that can be vaporized, the more stunning the



Mark Hammergren, astronomer at the Adler Planetarium in Chicago, is photographed September 12, 2013, with an image of the comet ISON on his computer. The comet will be closest to the sun on Nov. 28 and might be highly visible before dawn on the days just following that.

comet, Hammergren said.

"We don't know how ices are distributed around the comet," he said. "Could there be a big deposit of ice that could be exposed to the sun as it gets closer? Could the comet, as it gets closer, rearrange itself, a landslide on the surface, perhaps, that could expose new ice?"

"All of these things could change a comet's behavior from one day to the next," he said.

Comets that pass particularly close to the sun, like ISON, also risk breaking apart, as comet Elenin did in 2011. In a eulogy of sorts at the time, NASA bid the "uninspiring" celestial nomad a final farewell.

"Perhaps a little homage to a classic Monty Python dead parrot sketch is in order," NASA asteroid expert Don Yeomans was quoted as saying. "Comet Elenin has rung down the curtain and joined the choir invisible. This is an ex-comet."

Astronomers think chances are relatively low that ISON will share Elenin's disappointing fate, though they cannot be certain until the comet gets closer to the sun. In the meantime, Hammergren continues to check on ISON's arrival and brightness at least twice a week, remaining cautiously optimistic in spite of himself.

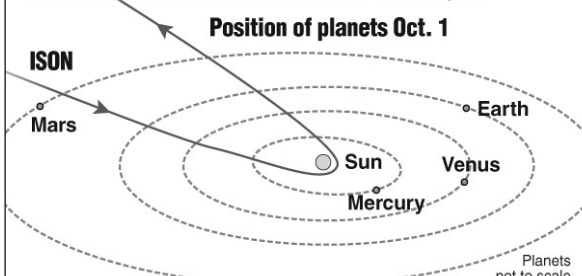
"I'm still hoping that it goes through some kind of major outburst and reverses its recent behavior," Hammergren said. "You maybe have one shot in a decade of seeing a comet. They are still very special events, very beautiful events and very ephemeral."

Comet light show a big 'if'

Comet ISON is projected to swing around the sun Nov. 28, and around that time it is expected to become visible to the naked eye in the Northern Hemisphere. As comets fall closer to the sun, heat vaporizes their ice, releasing plumes of gas and dust. Sunlight reflects off that debris, illuminating the comet.

'Sun-grazing' comet

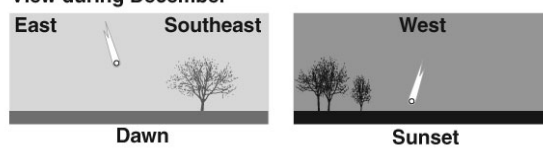
ISON is expected to pass roughly 730,000 mi. (1,174,820 km) above the sun's surface; although some sun-grazing comets have broken up on arrival, astronomers believe the chances are low that ISON will fall apart



Watching ISON

If ISON successfully swings around the sun and continues its outbound journey, it will be best viewed in the Northern Hemisphere from the middle of November through the end of December

View during December



Parts of a comet

Nucleus Core of ice, frozen gases, dust and rock
Coma Cloud of dust particles surrounding the nucleus
Tail Electrically charged gas (plasma)
Tail Dust particles

C/2012 S1 (ISON)

Classification Hyperbolic comet (An orbit coming from the far reaches of our solar system making one pass by the sun and heading out again)

Discovered Sept. 21, 2012, by astronomers Vitali Nevski and Artyom Novichonok

Speed 67,000 mph (107,825 kph) and expected to increase significantly throughout the fall

Diameter About 3 mi. (4.8 km)



ISON April 10, 2013

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Shooting

From Page 1

gious motivation.

Alexis, a former Navy reservist, had been undergoing mental health treatment from Veterans Affairs since August but was not stripped of his security clearance, according to the law enforcement officials, who spoke on condition of anonymity because the criminal investigation was still going on.

He had been suffering a host of serious mental problems, including paranoia and a sleep disorder, and had been hearing voices in his head, the officials said.

The assault is raising more questions about the adequacy of the background checks done on contract employees who hold security clearances — an issue that came up recently with National Security Agency leaker Edward Snowden.

Navy Secretary Ray Mabus

ordered two security reviews Tuesday of how well the Navy protects its bases and how accurately it screens its workers.

Similarly, President Barack Obama has ordered the White House budget office to examine security standards for government contractors and employees across federal agencies.

In addition, the House and Senate Veterans' Affairs Committees asked the VA for details about any treatment provided to Alexis.

At the U.S. Navy Memorial,

in church and on the baseball field, the nation's capital paused to mourn the victims. Defense Secretary Chuck Hagel laid a wreath at the memorial's "Lone Sailor" statue as taps played.

Just a few blocks from the Navy Yard, the Washington Nationals were back to playing baseball after their Monday night game with the Atlanta Braves was postponed because of the shooting. The Nationals wore blue and gold Navy caps during warm-ups, and a moment of silence was held before the first pitch.

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