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Glowing black holes and Professor Hawking



recently that scientists have started to unlock the mysteries of how those radiations are generated.

Earlier in 1974, it was the British theoretical physicist, William Stephen Hawking (a man crippled by a rare degenerative motor neuron disease), who for the first time showed that black holes can emit radiation. But before he came into the scene, the general belief among the scientific community was that black holes cannot radiate any energy as they are the ultimate end of a star with masses greater than that of the sun. Due to huge mass, a black hole's force of degeneracy fails and gravitational force exerts its overwhelming force triggering a sudden collapse of the star.

Through its strong gravitational effect on nearby stars, a black hole can be located. In our galaxy a black hole which is six times bigger than the sun has been detected near the Sagittarius X-1 stellar area. Due to quantum fluctuations near its 'event-horizon,' the boundary line of a black hole, virtual particles like gravitons (hypothetical particle of gravitation) or photons (light particles) collide with each other resulting in creation of real particles and emitting radiation. It is called Hawking Radiation. From the 'event-horizon' of a black



Stephen Hawking

hole, no event can be signalled. The hypothetical graviton has zero mass and can fly at the speed of light. A photon is an indivisible electromagnetic radiation having zero mass. Due to black hole's immense power, imaginary particles entering its abyss of void become real particles. However, inclusion of gravitation in the remaining forces of the universe is yet to be solved. Following emission of radiation, a black hole sometimes may lose its mass. However, its ultimate fate is not known. It is believed that a situation similar to the black holes existed in the early stages of the universe when it was created from the Big Bang. Hawking says we may not find a unified role at all still it is imperative to try for it.

The writer is former senior Scientific officer, BCSIR.

A black hole guzzles gas like a pig at a trough. It emits bursts of electromagnetic energy, which illuminate the entire scene.

BAZUL KARIM AKANDA

BLACK holes are black because they eat up even the light that comes out of the matter being crushed into nothingness under its fearsome gravitational pull. However, it is from their pull on other objects outside them that black holes'

presence can be known. While black holes themselves are invisible, their surroundings are dominated by powerful magnetic and gravitational forces. Those forces produce extremely bright radiations. Those radiations include cosmic rays, plasma jets and gamma-ray bursts that travel across the universe. It is very



NEW FINDINGS

Green energy vs. food security



Jatropha gets new attention as a source of biofuel.

NICO Strydom, a Jatropha farmer in Mozambique looks out over the 10-month-old, 1,000-hectare farm he runs for Sun Biofuels, a British-based company that hopes jatropha will turn African farmland into a fuel source for the 21st century.

He is not an expert on jatropha. That knowledge gap is causing some nervousness in Mozambique, an impoverished country with a history of civil war and natural disaster that has made it vulnerable to food shortages.

Jatropha enthusiasts say the plant can grow almost anywhere, yielding high outputs of cleaner, renewable energy, without taking quality farmland



Jatropha farmer in Mozambique inspects his farm.

away from food crops.

But skeptics question those claims and argue Mozambique should not grow an inedible biofuel crop when it still struggles to feed all its people.

Indeed, the debate goes beyond Mozambique. The United Nations says the world's food supply needs to grow 70 percent in the next four decades to feed a population expected to reach 9.1 billion.

Source: AFP

Lots of water on Moon!



Plume created by the LCROSS Centaur upper stage rocket after impact.

SUDDENLY, the moon looks exciting again. It has lots of water, scientists said a thrilling discovery that sent a ripple of hope for a future astronaut outpost in a place that has always seemed barren and inhospitable.

Experts have long suspected there was water on the moon. Confirmation came from data churned up by two NASA spacecraft that intentionally slammed into a lunar crater last month.

"Indeed, yes, we found water. And we didn't find just a little bit. We found a significant amount," said Anthony Colaprete, lead scientist for the mission, holding up a white water bucket for emphasis.

Source: AP

MYSTERIES

Fall of the Minoans



WHILE many historians are figuring out what caused the collapse of the Roman Empire pretty high up on their to-do lists, the fall of the Minoan empire has proved just as puzzling. Three and a half millennia ago, life on the island of Crete—which boasted a mythical King and his man-eating beast—was disrupted by a volcanic eruption at neighboring Thera Island. Clay tablets unearthed by archaeologists revealed that, instead of folding, Minoans carried on for another 50 years before finally packing it in. Theories of what finally did them in include a scenario in which subsequent volcanic ash covered devastated harvests and one where a weakened society was left vulnerable to an eventual Greek takeover.

OUR COSMIC HOME



THIS NASA handout illustrates the two types of spiral galaxies that populate our universe—those with plump middles, or central bulges (upper left), and those lacking the bulge (foreground). New observations from NASA's Spitzer Space Telescope provide strong evidence that the slender, bulgeless galaxies can, like their chubbier counterparts, harbour supermassive black holes at their cores. Previously, astronomers thought that a galaxy without a bulge could not have a supermassive black hole. In this illustration, jets shooting away from the black holes are depicted as thin streams. The findings are reshaping theories of galaxy formation, suggesting that a galaxy's "waistline" does not determine whether it will be home to a big black hole.

Source: AFP

Forgotten indigenous baby food

JAMAYET ALI

In this age of imported baby foods of a hundred and one brands, we have about forgotten our Shoti, an indigenous baby food made from the root of a perennial green plant. In the past, traditional doctors such as a Kaviraj, who practiced age-old Ayurvedic medicine, would invariably prescribe the white powdered root of shoti (scientific name 'curcuma zedoaria'), also called 'white turmeric' in English, for convalescing patients as a substitute for barley. It usually grows in the wild, but villagers in the past might also leave a fallow piece of land to cultivate it along with other similar plants.

You can recognise 'shoti' plant from its elliptical green leaves tinged with brownish purple, short stem and pink or yellow flowers. Scientists of the 'Carbohydrate research wing of the Bangladesh Council of Scientific and Industrial Research (BCSIR) laboratories have meanwhile proved that the powdered tuberous root of 'shoti' can be used as a baby food. With large and fleshy tubers, which are rich in starch, the plant grows to a height of at least 2ft.

As mentioned earlier, the 'shoti' starch, a white amorphous polysaccharide, is highly valued as a diet for infants and convalescents.

BCSIR scientists have experimentally shown that in addition to its high quality starch content, 'shoti' powder's quality can be further enriched by mixing it with cow milk, vitamin A and D and so on.

Among the scientists involved in this research are Md. Asaduzzaman, former chief scientific officer and Md. Bazlul Karim Akanda, former senior scientific officer of the 'Carbohydrate section' of the BCSIR labora-



Shoti plants grown in the wild.

tories.

Scientists also observed that various types of glucose can be prepared after modification of 'shoti' starch by chemical process. This type of glucose can be used in the confectioneries, soft drink plants as well as in the rayon, tannery and even pharmaceutical industries.

The writer is former Public Relations Officer, BCSIR.

MYTHS & FACTS

Mummy's Curse



The mummy of King Tut. The myth of pharaoh's curse can be traced back to a London stage act performed a hundred years before the boy king's tomb was excavated in 1922.

THE "mummy's curse" first enjoyed a worldwide vogue after the 1922 discovery of King Tutankhamun's tomb in the Valley of the Kings near Luxor, Egypt.

When Howard Carter opened a small hole to peer inside the tomb at treasures hidden for 3,000 years, he also unleashed a global passion for ancient Egypt.

That's glittering treasures made great headlines and so did sensationalistic accounts of the subsequent death of expedition sponsor Lord Carnarvon.

In reality, Carnarvon died of blood poisoning and only six of the 26 people present when the tomb was opened died within a decade. Carter, surely any curse's prime target, lived until 1939.

But while the pharaoh's curse may lack bite, it hasn't lost the ability to fascinate audiences which may be how it originated in the first place.

The late Egyptologist Dominic Montserrat conducted a comprehensive search and concluded that the concept began with a strange "strip tease" in 19th-century London.

Quiz 1

This inventor was educated by his mother.

Question. Who was he?

- a. Benjamin Franklin.
- b. Alexander Graham Bell.
- c. Thomas Edison.

Quiz 2

This invention was inspired by the Star Trek television series.

Question. What was the invention?

- a. Laser beam.
- b. Cell phone.
- c. Voice biometrics (speech recognition).

Ans for previous quiz

Quiz 1

Who was he?

- a. Albert Einstein.

Quiz 2

What was the invention?

- a. Krazy Glue was invented at Kodak.

The glue bonded with anything it contacted. Harry Coover invented it while working for Eastman Kodak.

SCIENCE QUIZ