

NEWSPAPER HIGHLIGHT

A solar flare that occurred on the Sun triggered a magnetic storm which scientists from Center of Excellence in Space Sciences India (CESSI), in Indian Institutes for Science Education and Research, Kolkata, had predicted will arrive at the Earth in the early hours of November 4, and they said that the magnitude of this storm would be such as to trigger spectacular displays of aurora (the coloured bands of light seen in the North and South poles) in the high latitude and polar regions, just in time for the Deepavali celebrations in India. This prediction, which was based on models built by them and data from NASA's observatories, seems to have come true, as people from several countries were tweeting pictures of aurorae. The solar magnetic cycle that works in the deep interior of the Sun creates regions that rise to the surface and appear like dark spots. These are the sunspots. Solar flares are highly energetic phenomena that happen inside the sunspots. In a solar flare, the energy stored in the Sun's magnetic structures is converted into light and heat energy. This causes the emission of high energy x ray radiation and highly accelerated charged particles to leave the Sun's surface. Sometimes solar flares also cause hot plasma to be ejected from the Sun, causing a solar storm, and this is called Coronal Mass Ejection (CME). Coronal Mass Ejections can harbour energies exceeding that of a billion atomic bombs.

Scientists studying the galaxy Messier 87 (M87) – which surrounds the only black hole to have been imaged so far – have come up with a theoretical model of the jets of material emanating from M87. The calculated images published in Nature Astronomy resemble closely what is observed, and help confirm Einstein's theory of relativity.

Researchers found that the thalamic reticular nucleus (TRN) – a region that forms a capsule around the thalamus of the brain – played a role in the connection between sleep disturbance and Alzheimer's in mouse models. Reduced TRN activity was found to reduce slow-wave sleep and its activation restored sleep and reduced amyloid plaques in mice.

Developing an accurate record of radiocarbon in the atmosphere from 55,000 years ago is key to understanding Earth's processes,

THREE-STEP SYNTHESIS ROUTE FOR MOLNUPIRAVIR

1. Researchers have engineered enzymes to enable faster manufacture of antiviral drug molnupiravir. Molnupiravir is an investigational oral antiviral for treatment of Covid-19, which was originally developed to treat influenza. Molnupiravir works by causing viruses to make errors when copying their own RNA, introducing mutations that inhibit replication.

2. Recently, molnupiravir reduced the risk of hospitalization and death from COVID-19 for newly diagnosed, at-risk patients, and that it worked equally well against different SARS-CoV-2 variants. In the new study, a 3-step synthesis route was developed - from a sugar molecule called ribose - to increase the yield of Molnupiravir.

3. They identified enzymes or chemical treatments to sequentially add the appropriate chemical groups to ribose to generate the molecule. For the 2nd step of the synthesis, the team identified bacterial enzymes that weakly catalyzed the desired reactions.

4. Using in vitro evolution, they greatly enhanced these enzymes' activities. This new route, which also included a phosphate recycling strategy, was 70% shorter and had a 7-fold higher overall yield than the original route.

MARQUEE INSTITUTIONAL INVESTORS

1. Infrastructure Investment Trusts (InvIT) of the National Highways Authority of India (NHAI) attracts marquee institutional investors.

2. A marquee investor is an investor well known for investing in companies that turn into success stories at a later date. This person could be either an individual or a corporate/ institutional investor.

3. The purchase of some company's shares by such investors gives others the hope that these companies would turn out to be profitable investments for them too. While this can prove to be true in many cases, it is not a rule, because no investor can dictate future business and economic events.

4. So, one should not just look at the presence of marquee investors, but the potential of those companies and then invest.

ON DEALING WITH FALSE CRIMINAL CASE

1. There has been increasing misuse of legal provisions such as Section 304B on dowry deaths and Scheduled Castes (SCs) and Scheduled Tribes (STs) (Prevention of Atrocities) Act, 1989. What does the data show on false allegations? Section 304B in of Indian Penal Code provides for an imprisonment for a term which shall not be less than seven years but which may extend to imprisonment for life for committing dowry death.

2. As per NCRB's Crime in India 2020 report, about 5% of the cases under Section 498A were found to be false. Out of the 17,765 cases under Section 498A decided by the courts, only 3,425 cases ended with a conviction. About 12% of the cases under the SCs and STs (Prevention of Atrocities) Act were found to be false by the police. Out of the 8,138 cases under the SCs and STs (Prevention of Atrocities) Act decided by the courts, only 3,588 cases ended with a conviction.

3. What has been the court's view on these provisions? Dowry deaths - Realising the misuse of Section 498A, the Supreme Court in Rajesh Sharma vs State of Uttar Pradesh (2017) issued certain guidelines. Formation of district Family Welfare Committees (FWCs) Restraint on arrest till the complaint was examined by the committee Disposal of the proceedings by a senior judicial officer in case of a settlement between the parties But in 2018, the Supreme Court in Social Action Forum for Manav Adhikar vs Union of India held that the constitution of the extrajudicial FWCs was contrary to the procedure prescribed under the Code of Criminal Procedure (CrPC).

4. SCs and STs (Prevention of Atrocities) - The Supreme Court in Subhash Kashinath Mahajan vs State of Maharashtra (2018), issued certain guidelines. Holding of a mandatory preliminary inquiry to avoid false implication of an innocent individual Approval of the appointing authority before the arrest of a public servant However, in 2019, the Supreme Court in Union of India

climate change and our future. In an article in Science, researchers described this. For example, radiocarbon holds fingerprints of solar storms, which can today destroy much of our communications network.

Despite having not a single neuron to call a brain, sponges perform complicated tasks such as filtering out tens of thousands of litres of water through their bodies to collect food. A recent study published in Science found that they use a complex cell communication system to regulate feeding and weed out harmful bacteria. This could be a feature from which the complex nervous systems evolved.

How effective are climate change pledges made by countries in containing global warming? A study published Friday in the journal Science finds that the latest Nationally Determined Contributions by 120 countries, as of September 30, improve the odds of global temperature rise staying below 2°C by 34% and below 1.5°C by 1.5%. By way of comparison, the 2015 pledges made by countries at the Paris Agreement promised only a 8% chance of temperatures staying below 2°C, and zero—or no chance—at 1.5°C. If countries were to follow a more ambitious path beyond 2030, those probabilities rose to 60% and 11% respectively. The findings while optimistic come amidst the deliberations underway at Glasgow where the greatest global effort is underway to have countries sign on to an agreement to keep temperatures below 1.5°C and, to this end, have most major economies pledge to reach net zero by midcentury. Net zero is when a country's emissions are offset by having an equivalent amount removed from the atmosphere for zero emissions in balance.

Upholding the need for judges to be sensitive to the gravity of mental health issues, the Supreme Court has said the judiciary should not treat the mental health of a person with a “one size fits all” approach. A Bench of Justices D.Y. Chandrachud and B.V. Nagarathna made the observation in a recent judgment based on an appeal filed by Karnataka against a High Court decision to quash a case of abetment of suicide against a Government officer.

Arunachal Pradesh is planning to make a documentary about one of its most “patriotic destinations” — Kaho, a village on the China border — to mark the 75th year of Independence. The State's Department of Information, Public Relations and Printing has sent a 12-member team to Kaho in Anjaw district for filming a documentary

vs State of Maharashtra and Ors., overruled the above judgment and held that the guidelines were opposed to the protection given to members of SC and ST communities.

5. Is there any legal remedy available against those lodging false complaints? Criminal action can be initiated against the person who gives false information to the police or levels specific criminal charges against a person. The police after the investigation may initiate action under Section 182 or 211 of the IPC respectively and both these offences are non-cognisable and a magistrate's nod is necessary for further legal action. A judicial magistrate having jurisdiction, after an inquiry, can take appropriate action against a person who filed a false case with the police.

6. The complainant may approach a High Court for anticipatory bail and for quashing the FIR. The High Court, under Section 482 of the CrPC, may quash the judicial proceedings even after a conviction, in case a genuine compromise is reached between the conflicting parties. Damages may be claimed under the law of tort for malicious prosecution and causing injuries. Since the onus of arriving at the truthfulness of a case lies primarily with the investigating officer, it is their duty to investigate the case thoroughly and collect all the facts and circumstances fearlessly.

SEBI-ESG FUNDS

1. SEBI recently came out with a consultation paper for introducing disclosure norms for ESG (environment sustainability and governance) mutual fund schemes. What are ESG funds? ESG Mutual Funds are Thematic Mutual Funds that invest in socially responsible companies. ESG funds are those funds whose asset allocation mostly includes shares and bonds of companies that are evaluated based on the environmental, social, and governance factors. An organisation is said to be ESG compliant if it meets all the criteria of environmental, social, and governance standards. The ESG companies are assessed on their sustainability before they are given the tag. The ESG parameters reflect on an organisation's culture, the risk involved, and management, among other things.

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4. What is the rationale? With the increased emphasis on adopting sustainable growth, there has been a surge in ESG investing globally. ESG assets surpassed \$35 trillion by the end of 2020. The momentum is expected to continue with ESG funds accounting for a third of global assets under management in 5 years. Investing based on the ESG theme is beginning to attract higher interest in India too.

5. As per SEBI data, at the end of September 2021, there were 8 ESG thematic equity schemes with assets under management (AUM) of ₹12,085 crore. However, the regulation of this segment is at a nascent stage, globally and nationally. SEBI's recent norms is an effort to tighten the disclosure, strategies and practices of funds based on the ESG theme. It will help check ambiguity and usher in transparency.

HOW TO DEFINE A FARMER

1. Categorising farmers based on dependence on farm income and land ownership has stirred debates. What is the categorisation about? The Agriculture Census for 2015-16 placed the total operational holdings in India at 146.45 million. National Statistical Office's Situation Assessment of Agricultural Households (SAAH) report for 2018-19 pegs the country's agricultural households at 93.09 million. This wide variation has largely to do with methodology. The Agriculture Census looks at any land used even partly for agricultural production and operated/managed by one person alone or with others. The land does not have to be owned by that person (cultivator), who needn't also belong to an agricultural household. The SAAH

on the village and its people. One of seven villages in the Kibithoo block bisected by the Lohit river, Kaho had weathered the Chinese attack in 1962. Its people had assisted the Indian soldiers who had been outnumbered.

The Supreme Court in the Pegasus case underlined the principle that the Government cannot take an “adversarial position” when the fundamental rights of citizens are under threat. The Government cannot decline information to citizens that concern their privacy by simply raising the bogey of national security. The state cannot blame judges of “judicial oligarchy” or acting “the aristocracy in the robe” for seeking information on behalf of citizens.

report considers only the operational holdings of agricultural households.

2. While the Census treats each of them as separate holdings, the SAAH takes all these lands as a single production unit. Those households whose net receipts from farming are at least 50 per cent of their total income from all sources are categorized as full-time/regular farmers.

3. The mention of minimum land (more than 1 hectare or 2.5 acres) required for farming to be viable excludes about 70 per cent of agricultural households in the country which they do not possess. There is a suggestion that the agricultural policy should target only serious/regular farming households as they genuinely depend on farming.