

Newspaper Clips January 23, 2015

Deccan Herald ND 23/01/2015

p-7

Govt delays leave three IITs headless

Prakash Kumar

NEW DELHI: Notwithstanding the National Democratic Alliance government's commitment to fast-track governance, the top posts in three Indian Institutes of Technology (IITs) have remained vacant for more than six months.

The posts of directors in IIT Bhubaneswar, Patna and Ropar are yet to be filled, after the terms of their last occupants came to an end in June.

Sources in the premier institutes told *Deccan Herald* that the Human Resource Development (HRD) Ministry is unable to fix a time for interview, despite the search-cum-selection committees set up to identify eligible candidates wrapping up the exercise and submitting the list of names.

IIT Bhubaneswar is currently managed by the institute's dean of faculty and planning Sujit Roy, who was appointed acting director, while IIT Kharagpur Director Partha Pratim Chakrabarti has been given additional charge of IIT-Patna.

IIT Ropar Director K Surappa is currently on extension.

Absence of a permanent director is hampering the day-to-day functioning of the institutes, especially IIT Bhubaneswar, where the vacancy has called into question its ability to shift to a permanent campus this year since it would involve paper work and financial decisions the acting director may not be able to handle.

The position of Registrar is also vacant in IIT

Clock is ticking

■ The delay began with Human Resources Minister Smriti Irani's discarding the list of candidates recommended by the UPA-appointed selection committee

■ A fresh selection process had to be started

■ IIT Bhubaneswar is particularly affected by not having a director as shifting to a permanent campus has become difficult

Bhubaneswar. "Major policy decisions cannot be taken in the absence of the director of an institute," sources said.

Though the UPA-appointed search-cum-selection committee submitted the list, the previous government could not act on it since the model code of conduct for the 16th Lok Sabha elections came into force.

When Smriti Irani took over as HRD minister under the new NDA regime, she was not favourable with any of the recommended candidates, leading to the repeat of the exercise to select fresh names.

"The file is stuck with the ministry and no decision has been taken on the names recommended by the committees," sources said.

"The ministry has to fix dates for interviewing the candidates. I do not know why it is not being done. The ministry should speed up the process," a source added.

DH News Service

IIT-B Unveils 'World's Cheapest' Netbook

Anumeha.Chaturvedi
@timesgroup.com

New Delhi: IIT Bombay has developed a 10-inch netbook, which it claims could be the world's cheapest, at around ₹6,000. The netbook, conceived during the institute's work with the low-cost Akash tablet, will be unveiled in the second week of February.

"We wanted a device that would make it easy for people to 'create' information. The netbook was born out of this desire," says professor Kannan Moudgalya at IIT Bombay. He explains that while a tablet is useful to retrieve information, a netbook can create it, through processes such as programming and data entry.

The IIT Bombay team has worked on designing the netbook's specifications besides creating the OS image and the accompanying software bundle.

"One of the mandates of the low-cost tablet project was to continue to do research and development on affordable access-cum-computing devices," says Moudgalya.

The project's objective was to understand its shortcomings and address them in the next product. In a bid to address the needs of students and to drive information creation, the team at IIT Bombay thought it was important to have a fully functional keyboard as opposed to a virtual keyboard, more battery time, a larger screen size (10 inches as compared to a 7-inch screen on a tablet), greater memory, more storage, a normal USB slot (not a micro USB), while not letting go of the price focus. The netbook also needed to be light-weight for students to carry comfortably.

"We put in a lot of effort to arrive at specifications for the hardware — trying out various machines available in the market, working with different design specifications, and then looking for manufacturers through a tender process," says Moudgalya.

IIT Bombay has tied up with Del-

The Lowdown On The Netbook

- **Cost:** Around ₹6,000
- **Designed to help students**
- **10-inch netbook weighs less than 1 kg**



COMES WITH:

- A **complete** keyboard
- **1GHz** dual core WM8880 ARM v7 Processor
- **5,000 mAH** battery
- **Two** USB drives, WiFi, Bluetooth



hi-based company Basic Computers, which has delivered 1,000 netbooks for the pilot phase.

Under the pilot, IIT Bombay plans to lend these netbooks to all first year B Tech students at the institute who have to undergo an introductory programming course, CS 101.

Out of nearly 450 students who are taking this course in the current semester, close to 100 do not have their own laptops.

The HRD ministry's Akash project, undertaken during the UPA regime, was marred by launch delays and quality issues. "With the new government focusing on virtual classrooms, low-cost computing devices are the need of the hour, but there has to be a focus on quality. Also, the pricing shouldn't hamper functionality," says Rohin Kapoor, senior manager education practice at Deloitte.

Moudgalya says the Akash project has been completed successfully at IIT Bombay's end. One of the objectives of this project, he says, was to explore the viability of such a low-cost tablet. The second objective was to bring down the prices of such devices in the market. "We have achieved both these objectives and it is now with the Directorate General of Supplies and Disposals for final procurement," he adds.

लैटरल एंट्री के लिए तैयार नहीं आईआईटी संस्थान, खाली सीटों पर कोर्ट ने मांगी रिपोर्ट

केंद्रीय मानव संसाधन विकास मंत्रालय 2015-16 एकेडमिक सेशन से आईआईटी और एनआईटी संस्थानों में कॉमन काउंसलिंग के लिए तैयार है, लेकिन छात्रों को लैटरल एंट्री देने को लेकर आईआईटी राजी नहीं हैं। इन संस्थानों के जॉइंट एडमिशन बोर्ड का कहना है कि लैटरल एंट्री में छात्र एक से दूसरे संस्थान जाते हैं और इससे खाली सीटों की संख्या पर कोई असर नहीं पड़ता। बोर्ड का मानना है कि अलग-अलग सिलेबस, क्रेडिट ट्रांसफर की समस्याएं आदि भी इसके अनुकूल नहीं हैं। बोर्ड आरक्षित कोटे की खाली सीटों को सामान्य कोटे के छात्रों से भरने को भी तैयार नहीं है। दिल्ली हाईकोर्ट ने सरकार से इस मामले में स्टेटस रिपोर्ट पेश करने को कहा है। पिछले साल अगस्त में आईआईटी में खाली सीटों के मामले की सुनवाई करते हुए दिल्ली हाईकोर्ट ने कॉमन काउंसलिंग के साथ लैटरल एंट्री की संभावनाएं तलाशने का निर्देश सरकार को दिया था। इसकी रिपोर्ट 30 नवंबर तक देनी थी, लेकिन अब इस मामले की अगली सुनवाई 4 फरवरी को होगी।

IIT Bombay launches its own Moocs

The institute has added significant functionality to Open edX platform to create and offer MOOCs from IITBombayX

http://www.business-standard.com/article/management/iit-bombay-launches-its-own-moocs-115012201108_1.html

The Indian Institute of Technology, Bombay (IIT Bombay) will launch IITBombayX, the eXtended online educational services from the institute for the benefit of Indian learners, and training workshops for teachers.

[IIT Bombay](#) has added significant functionality to the Open [edX](#) platform to create and offer [MOOCs](#) (Massive Open Online Courses) from IITBombayX.

This includes modifications to make it suitable for blended MOOCs and Indian language interfaces. This would be extended in future to also cover the special needs of school education and vocational training.

[IITBombayX](#) will also simultaneously offer training workshops for teachers on 'effective teaching and mentoring students in online courses', for each of these three subjects, under T10KT (Train 10,000 Teachers) Project.

College teachers will now be trained on how to effectively enhance the learning of students, by mentoring the students of online courses. They will be trained to do this through discussion forums, as also through face-to-face interaction with students of their colleges who register for MOOCs. Faculty from IIT Bombay will be arranging live interactive sessions every fortnight, for such students and teachers.

Students will get an honour certificate of achievement certifying successful completion of the course after they have qualified in the tests.

Speaking on the benefits for these courses for Indian students, Prof. Phatak remarked, "students normally learn similar subjects and topics as part of their degree course. Our online courses will give them an exposure to the teaching and learning style of the IIT system, with its emphasis on solving hard problems, interactive discussions, explanation of difficult concepts, and continuous assessment with feedback. We believe that this will help them to further extend their knowledge of the subjects, and their skills in solving associated practical problems".

The courses will be launched in both English & Hindi on Republic Day and will be gradually made available in other Indian languages as well. The courses are likely to commence in first week of March 2015. Registrations start in February 2015.

IIT Bombay unveils 'world's cheapest' netbook

<http://economictimes.indiatimes.com/industry/services/education/iit-bombay-unveils-worlds-cheapest-netbook/articleshow/45985469.cms>

NEW DELHI: IIT Bombay has developed a 10-inch netbook, which it claims could be the world's cheapest, at around Rs 6,000. The netbook, conceived during the institute's work with the low-cost Akash tablet, will be unveiled in the second week of February. "We wanted a device that would make it easy for people to 'create' information.

The netbook was born out of this desire," says professor Kannan Moudgalya at IIT Bombay. He explains that while a tablet is useful to retrieve information, a netbook can create it, through processes such as programming and data entry.

The IIT Bombay team has worked on designing the netbook's specifications besides creating the OS image and the accompanying software bundle.

"One of the mandates of the lowcost tablet project was to continue to do research and development on affordable access-cum-computing devices," says Moudgalya.

The project's objective was to understand its shortcomings and address them in the next product. In a bid to address the needs of students and to drive information creation, the team at IIT Bombay thought it was important to have a fully functional keyboard as opposed to a virtual keyboard, more battery time, a larger screen size (10 inches as compared to a 7-inch screen on a tablet), greater memory, more storage, a normal USB slot (not a micro USB), while not letting go of the price focus. The netbook also needed to be light-weight for students to carry comfortably.

"We put in a lot of effort to arrive at specifications for the hardware — trying out various machines available in the market, working with different design specifications, and then looking for manufacturers through a tender process," says Moudgalya.

IIT Bombay has tied up with Delhi-based company Basic Computers, which has delivered 1,000 netbooks for the pilot phase.

Under the pilot, IIT Bombay plans to lend these netbooks to all first year B Tech students at the institute who have to undergo an introductory programming course, CS 101.

Out of nearly 450 students who are taking this course in the current semester, close to 100 do not have their own laptops.

The HRD ministry's Akash project, undertaken during the UPA regime, was marred by launch delays and quality issues. "With the new government focusing on virtual classrooms, low-cost computing devices are the need of the hour, but there has to be a focus on quality. Also, the pricing shouldn't hamper functionality," says Rohin Kapoor, senior manager education practice at Deloitte.

Moudgalya says the Akash project has been completed successfully at IIT Bombay's end. One of the objectives of this project, he says, was to explore the viability of such a low-cost tablet. The second objective was to bring down the prices of such devices in the market. "We have achieved both these objectives and it is now with the Directorate General of Supplies and Disposals for final procurement," he adds.

HRD ministry to submit reports on vacant IIT seats before Feb 4

<http://indiatoday.intoday.in/education/story/hrd-ministry-to-submit-reports-on-vacant-iit-seats/1/414793.html>

According to the reports, yesterday Delhi High Court had asked HRD ministry to submit a report for the vacant IIT seats. A division bench of HC, headed by Chief Justice G Rohini, directed the HRD ministry to submit a report in the light of its directions on the vacant seats in IITs, last August. The ministry will have to file the status report before February 04, which is a next date of hearing.

Rajeev Kumar, a teacher at IIT Kharagpur, had filed an interim application in a pending PIL at Delhi High Court through lawyer Prashant Bhushan that every year, hundreds of seats at IITs remain vacant - especially in courses that are not popular. Last year, 300 IIT seats and 600 NIT seats had remained vacant. The plea also alleged that IITs were averse to the idea of creating a common database for students who clear the Joint Entrance Examination (JEE) for entry to IITs and NITs.

Last year, the Centre for Development of Advanced Computing (CDAC) had prepared the software for common counselling but the IITs backed out at the last moment on the grounds that no trial runs have been conducted for it. This year again, IITs refused at the last moment despite government pressure.

The Delhi HC bench of Chief Justice G. Rohini and Justice Rajiv Sahai also asked the IITs and MHRD whether the reserved category seats at IITs that remain vacant could be transferred to the General Category.

The petitioner Rajeev Kumar, was given the freedom to make his suggestions to the HRD ministry. The government was asked to come to a decision prior to November 30, last year. The HRD ministry was also being enquired whether any provision exists for lateral entry into the IITs in the second year.

1,000 SCIENTISTS & SCIENCE LOVERS SIGN ONLINE PETITION TO BE PRESENTED TO GOVT

Don't Dilute Integrity of Scientific Process: Scientists



DO NOT RIDICULE

Crediting ancient Indian scientists with tech is ridiculing their achievements: SVYASA varsity V-C RB Kotemane

PLASTIC SURGERY

Researchers referred to PM Modi's claim in Oct that Ganesha and Karna were evidences of plastic surgery

ABSURD CLAIMS

People who have learned real science won't make such claims: prof MRN Murthy of ISC

Scholars get support from researchers of Sanskrit literature & Vedas

Bharath Joshi & Sowmya Aji

Bengaluru: Researchers and professors of science across the country, several of whom have PhDs from Ivy League institutions in the US and top institutions in India, have taken umbrage at political patronage leading to the mixing of science and mythology at the recently-held 102nd Indian Science Congress in Mumbai. They have support, strangely enough, from researchers into Sanskrit literature and the Vedas, who are aghast that "ridiculous" claims are being made, mocking the actual work of scientists in ancient India.

Over a 1,000 scientists and science lovers have signed an online petition 'Stop the attempts to dilute the integrity of scientific process in science meets', which will be presented to the 102nd ISC president SB Nimse and to Harsh Vardhan, Union Science and Technology Minister, by an independent forum called Breakthrough Science Society. Alumnus of Cornell, Princeton,

JNU, IISc and various top Indian institutions have signed it.

Rajani KS, ex-head of the biology department at Presidency College, Bengaluru, who belongs to the Breakthrough Science Society, alleges that there was political inter-

we don't know if the newly-appointed persons have any political background," she said.

The provocation is a paper presented by Captain Anand J Bodas, a retired principal of a pilot training facility on the second day of the event in January first week. The paper claimed that the Rig Veda and the Vimana Samhita by Maharishi Bharadwaj written 7,000 years ago gave the blueprints for an aircraft with 40 engines. He claimed that ancient Indians had built a plane that could travel between planets.

Soumitro Banerjee, a PhD from IIT-Delhi and Shanti Swarup Bhatnagar awardee told ET: "We've seen an increasing attempt from various sectors to mix history with mythology and science with unscientific beliefs. So much so that even a forum such as the Indian Science Congress (ISC) is being used to propagate these views."

"Science does require imagination, but it has to become material reality," professor Vikram Soni from Jamia Millia Islamia said.

ON BODAS PAPER

How can a paper that has not even been peer-reviewed be presented at the Congress?

RAJESH GOPAKUMAR Theoretical Physicist, Harish-Chandra Research Institute
ference in the conduct of ISC. "With a tradition of over a 100 years, it should have had dozens of Indian science speaking on contributions India has made. We see political interference in various ways — the heads of ICHR, NCERT, DRDO and ISRO have been replaced, although

Tweak education policy for collaboration with foreign universities: Hinduja

'Public sector's help needed in improving universities'

PRESS TRUST OF INDIA

Mumbai, January 22

With no Indian university figuring among the top 100 globally, industrialist GP Hinduja has urged Prime Minister Narendra Modi to alter government policy to allow foreign educational institutions to collaborate with domestic varsities to provide world-class education in the country.

"We have been boasting about the Nalanda and Takshshila universities. But, today, we don't have any that will even come in

the list of top 100 universities in the world. To improve the quality of education, we need to collaborate with foreign institutions," he said.

"Modi really wants to change the face of the country," Hinduja, co-chairman of the Hinduja group, told reporters on the sidelines of an event here last evening.

He said necessary policy changes should be made by the Modi government to enable foreign institutions to function here directly or in collaboration with domestic universities.

The change Modi wants can be ushered in through better education and healthcare facilities, he added. Hinduja said he has



written to Union HRD minister Smriti Irani requesting her to seek private sector support for upgrading Indian universities to world-class institutions.

"The Hinduja group has been approached by several prestigious educational institutions

for working together here. We are willing to do so, but a policy framework is needed for foreign institutions to operate," he said in his letter to Irani.

He pointed out that the legislation by the previous UPA government to allow foreign universities to operate out of the country was not even discussed in Parliament before it lapsed.

The government, he said, must explore all options to create an enabling environment for participation of foreign institutions in the Indian education system.

Hinduja also said there was an equal interest from reputed business houses to contribute to the higher education system through collaborations.

Feedback from grassroots to help frame edu policy

Akshaya.Mukul
@timesgroup.com

New Delhi: On Republic Day, the government will announce initiation of the New Education Policy (NEP) that for the first time proposes to get feedback from the grassroots involving each and every village in the country. The process for formulating the policy has been hammered out after months of brainstorming in the HRD ministry and many autonomous bodies.

The new education policy — coming after 1986 — aims to meet the demands of “changing dynamics of the population’s requirement with regards to quality education, innovation and research”.

Sources said what is unique about the formulation of NEP is the way it has been made participatory. The entire process is likely to take one year. In the process, the new government has shelved UPA’s idea of having a new national education commission that would have come up with the policy after discussions with all stakeholders. “We are letting ordinary citizens decide on what they want about education and not let a few intellectuals come up with a uni-

EVERY VILLAGE UNDER SCHEME

- **Biggest policy planning initiative** involving each and every village
 - From village, **discussions** will take place at **block level**, then **districts** and finally **state**
 - **Views will be collated** and after **brainstorming** at the **Centre**, **NEP will emerge**
 - **Discussions** will be on **32 themes**
- 12 for school education 20 for higher education
- **Entire process** to take one year

form policy for a country so diverse,” one source said.

As planned, discussion on NEP will begin at the village level and then go to the block level, followed by brainstorming in districts and finally at the state level. It will be the responsibility of each state to collate and bring out the larger issues brought at each level. Final discussions will take place at the Centre.

To facilitate discussions at each level, government has

shortlisted 32 themes and expects broad parameters of the new policy will emerge around them.

In the case of school education, themes are improving learning outcomes, extending outreach of secondary and senior secondary education, strengthening of vocational education, reforming school examination system, revamping teacher education, accelerating rural literacy, promotion of information and communication technology, new approaches to teach science and mathematics, school standards, promotion of languages and comprehensive education.

In higher education, themes that the NEP will look into are governance reforms, ranking of institutions and accreditation, quality of regulation, roles of central institutions, improving state public universities, integrating skill development in higher education, promoting online and technology-enabled learning, addressing regional, gender and social disparities, cultural integration, private sector partnership, internationalization, industry engagement to link education to employability, research and innovation.

PACKAGES HIKED BY UP TO 25%

Off the IIM Circuit, Placements Rock at Top B-School Campuses

Sreeradha D Basu & Devina Sengupta

Mumbai: A rush of offers from old and new recruiters, 10-15% hikes in average salaries, more international offers and the charge of the e-commerce brigade are marking the return of good times on campus. The country's top business schools, including the likes of MDI Gurgaon, SPJIMR, IIFT, XIM Bhubaneswar, NMIMS, WeSchool and SIBM, Pune are revelling in the best final placements in recent years.

"We had anticipated a good year but what we got was beyond expectations. Several recruiters who had come to campus had to go back empty-handed," says Kanwal Kapil, chairperson, placements at MDI Gurgaon. A 338-strong batch went into placements at MDI last week, including some 71 who already had pre-placement offers. At the end of a hectic first day, only five students were left to be placed, says Kapil. "It was crazy."

Reflecting the upbeat business sentiment, recruiters are wooing talent with pay packages that have gone up by up to 20-25% as compared to last year. Conglomerates such as RIL, the Mahindra Group and the Tata Group are reportedly paying upwards of ₹17-20 lakh while banking majors including Citibank and HSBC are paying between ₹17.5 lakh and ₹18 lakh. Goldman Sachs is offering between ₹30 lakh and ₹32 lakh; ICICI Bank is offering around ₹14.5 lakh.

Citi India is visiting top-rated business schools apart from the IIMs for the Management Associate and Experienced Management Associate programmes for candidates with work experience. "Our hiring numbers are between 63 and 65 students," says Sarab Preet Singh, head of recruitment, learning and development.

In the consumer space, companies including P&G, Asian Paints, Godrej, Marico, HUL and Colgate-Palmolive are shelling out between ₹18 lakh and ₹23 lakh while consulting

Package Deals: Non-IIM Placements

10-15%

hike in average salaries across campuses including MDI Gurgaon, SP Jain Institute of Management and Research, Indian Institute of Foreign Trade, XIM Bhubaneswar, NMIMS, WeSchool and SIBM, Pune

Goldman Sachs, BCG, Colgate-Palmolive, Snapdeal, Amazon among companies offering salaries of ₹20-lakh plus

Pre-placement offers

have shot up by

40-50%

Most companies recruiting in bigger numbers than last year

Top recruiters across sectors include Goldman Sachs, Cognizant, JP Morgan, BCG, Mahindra & Mahindra, RIL, Tata Motors, Citibank, HSBC, Infosys, HUL

E-commerce sector recruiting aggressively with Flipkart, Snapdeal and Amazon leading the charge

GLOBAL PLACEMENTS

International placements

pick up. IIFT has 13

foreign offers with

\$1,10,000

as top salary from

a US company

Two German companies have made the highest offers at MDI Gurgaon

At SPJIMR, a UAE-based financial consulting firm has offered the top salary of ₹29.5 lakh

major BCG is offering over ₹26 lakh.

Salaries from EY range between ₹16 lakh and ₹20 lakh and from Infosys, between ₹13 lakh and ₹21 lakh.

From the buzzing e-commerce domain, Flipkart is paying around ₹17 lakh; Snapdeal ₹22 lakh-plus, while Amazon is offering up to ₹29 lakh for product roles. Depending on the relevant experience, salaries could go up further; the variable component is of ten additional.

"Given the rapid growth in the e-commerce industry, it is imperative to look at innovative talent from various B-schools. To bridge this growing demand for talent, we are planning to hire close to 150 candidates from B-schools this year," says Surinder Bhagat, senior director—HR at Flipkart.

Of this, anywhere between 100 and 112 students will be from non-IIMs alone. Last year, the company's total intake across all B-schools was at 110. Management students are being hired across various functions like supply chain, product marketing, technology automation, analytics, business finance and HR and will go through a management trainee programme.

Like Flipkart, many other companies are also stepping up hiring. At WE School, for instance, Infosys has taken 36 students this year as compared to 11 last year. At SP Jain Institute of Management and Research, several first-timers on campus have hired in good numbers, says Sonali Kohli Mehra, deputy chairperson—external relations, PGDM at the institute. First-timers at

SPJIMR including SAP, the Future Group, Bharti Retail, Godrej and Snapdeal have hired around 7-8 students each, some going up to double digits. At MDI, Snapdeal and Flipkart together hired around 42 students.

Besides a 40-50% average increase in the number of pre-placement offers (PPOs) across institutes, top salaries have also surged. At IIFT, there has been a 20% rise in the highest compensation offered, while at XIM Bhubaneswar, where placements are still on, the highest salary so far has been ₹20.5 lakh from Hindustan Coca Cola Beverages, as compared to last year's highest of ₹18 lakh from the same company.

International placements have picked up as well. IIFT—where the top salary from a US company is at \$1,10,000—has 13 foreign offers across locations such as Beijing, Melbourne, San Francisco, Dubai, Moscow, Bangkok, Singapore and Nigeria from recruiters such as Louis Dreyfus, Glencore, AluZinc Asia, Phoenix Commodities and Vital Solutions Singapore. Two German companies made the highest offers at MDI Gurgaon; at SPJIMR, a UAE-based financial consulting firm making its debut on campus offered the top salary of ₹29.5 lakh.

SIBM Pune saw a talent war being waged with a number of students being made multiple offers, says R Raman, director. Average package at the institute has shot up to ₹13 lakh from ₹11.71 lakh last time.

The highest international and domestic offers are at ₹31 lakh and ₹22 lakh respectively as compared to ₹28 lakh and ₹19.33 lakh last year.

Close to 70 companies participated in the placement process.

At NMIMS' Mumbai campus, where final placements are still on, the institute expects participation from around 125 companies including 45 first-timers. Leadership and strategy profiles are being offered apart from the usual ones, and students have received over 170 PPOs/PPIs.

In a first, scientists slow down speed of light

Kounteya Sinha
@timesgroup.com

Scientists have for the first time slowed down the speed of light travelling through air. This finding shows unambiguously that the propagation of light can be slowed below the commonly accepted figure of 299,792,458 metres per second, even when travelling in air or vacuum.

Researchers from the University of Glasgow and Heriot-Watt University demon-



BIG FEAT: Researchers say that applying a mask to an optical beam to give photons a spatial structure can reduce their speed

strated that applying a mask to an optical beam to give photons a spatial structure can reduce their speed.

The team compare a beam of light to a team of cyclists who share the work by taking it in turns to cycle at the front. Although the group travels as a unit, the speed of individuals vary. The group formation can make it difficult to define a single velocity for all cyclists, and the same applies to light. A single pulse of light contains many photons and light pulses are characterized by a number

of different velocities. The team's experiment was like a time trial race, with two photons released simultaneously across identical distances towards a defined finish line.

Researchers found that one photon reached the finish line as predicted, but the structured one arrived later. Daniel Giovannini, a lead author of the paper, said, "The delay we've introduced to the structured beam is small, measured at several micrometres over a distance of one metre, but it is significant."

Times Of India ND 23/01/2015 p-23

Interstellar-style wormhole exists in Milky Way?

Washington: An Interstellar-style space-time tunnel may exist in the Milky Way and we could even travel through it, according to a new theory proposed by an international team of scientists, including those from India.

Based on the latest evidence and theories our galaxy could be a huge wormhole and, if that were true, it could be "stable and navigable," scientists say.

"If we combine the map of the dark matter in the Milky Way with the most recent Big Bang model to explain the universe and we hypothesize the existence of space-time tunnels, what we get is that our galaxy could really contain one of these tunnels, and that the tunnel could even be the size of the galaxy itself. But there's more," said Paolo Salucci, astrophysicist of the International School for Advanced Studies (SISSA) of Trieste, Italy, and a dark matter expert. "We could even travel through this tunnel, since, based on our calcula-

© NASA/JPL-Caltech/Corbis



UNRAVELLING SECRETS:

According to the new theory, the Milky Way may have space-time tunnel and we could even travel through it

tions, it could be navigable," Salucci said.

The research was published in a paper in the *Annals of Physics*, which Salucci authored with Farook Rahaman from Jadavpur University in Kolkata and a group of Indian and North American researchers. "Obviously we are not claiming that our galaxy is definitely a wormhole, but simply that, according to theoretical models, this hypothesis is a possibility," said Salucci. ४१