

“Dissemination of Education for Knowledge, Science and Culture”

- Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur

(Autonomous)

Best Practice

**“A scientific Study of Kirnotsav in Mahalaxmi
(Ambabai) Temple, Kolhapur during ‘Dakshinayan’ and
‘Uttarayan’ of Sun”**

by

Department of Physics and IQAC

in

2018 – 19

Submitted by

Head of the Department,

Department of Physics, Vivekanand College, Kolhapur (Autonomous)

Submitted to

Internal Quality Assurance Cell (IQAC)

Vivekanand College, Kolhapur (Autonomous)

(2018 – 19)

Introduction

Mahalaxmi (Ambabai) temple built in an ancient time is an excellent architectural design with natural stones. Kirnotsav at Mahalaxmi (Ambabai) temple, Kolhapur, Maharashtra is one of the most awaited festivals for a people from Maharashtra and other states. It is also becoming popular amongst people from other countries. During 'Dakshinayan' and Uttarayan of sun the sun rays' traverse about 200 meters, from Mahadwar arch to idol goddess Mahalaxmi (Ambabai). During 'Dakshinayan' of Sun (November 9,10 and11) and Uttarayan of Sun (January 31 and February 1 and 2) sun rays spectacularly illuminates an entire path, that dominates reddish golden sunrays stemming from longer wavelength of solar spectrum (650-700 nm). The typical path following by sun rays during 'Dakshinayan' is: Mahadwar road arch (5.00pm), Garud mandup back side (5.17pm), Garud mandup (5.21 pm), Ganapati mandir back side (5.26 pm), Kasav chowk (5.32pm), Pitali Umbhartha (5.37 pm), Khajina chowk (5.39 pm), Garbhgruha first step (5.41 pm), Garbhgruha second step (5.42 pm), Garbhgruha third step (5.43 pm), Garbhkuti (5.43 to 5.44 pm), Katanjan (5.44 pm), idol (5.45 to 5.49 pm). In Uttarayan of sun the typical path following by sun rays is Mahadwar road arch (5.18 pm), Garud mandup back side (5.36pm), Garud mandup (5.41 pm), Ganapati mandir back side (5.44 pm), Kasav chowk (6.00pm), Pitali Umbhartha (6.05 pm), Khajina chowk (6.07 to 6.08 pm), Garbhgruha first step (6.10 pm), Garbhgruha second step (6.11 pm), Garbhgruha third step (6.12 pm), Garbhkuti first step(6.12 to 6.13pm), Katanjan (6.14 pm), idol (6.15 to 6.19 pm). The entire event of 3 days is supposed to be highly sacred and religious. Thus, attracts about 30 thousand people every day. It is supposed to be very fortune and life fulfilling event for all those who attended it personally.

Kirnotsav has been always the topic of great enthusiasm and full of complexities. Hence previously some people tried to undertake its scientific study. However due to many reasons, for several years the festival did not take place full-fledged i.e. sun rays did not reached up to the face of the idol or covers entire idol, and the overall light intensity as the path was reduced.

Contribution by Faculty of Department of Physics, Vivekanand College, Kolhapur

Prof. (Dr) Milind Manohar Karanjkar, Head, Department of Physics and Astrophysics, Vivekanand College, Kolhapur (Autonomous) and his team of students decided to work on these problems scientifically to overcome the problem and get remedy on it, few years back.

The team of researchers have observed following problems:

- 1) The heavy traffic at nearby places of temple and human interference created enormous amount of dust particles that scatter sun light and deviate their path. This lessens the intensity of sun rays and their amount which are not enough to illuminate full idol, with desired intensity.
- 2) A crowd of about 2000 people, gathered inside the temple, caused dramatic increase in abnormal humidity. This refracts the sun rays to a great extent.
- 3) In addition, direct human interference in the pathway obstructs sun rays.
- 4) The nearby shopkeepers used to lighten their shops, which increased stray light.
- 5) Further obstructions occurred due to building, water tanks, trees, hoardings and electric cables.
- 6) Furthermore fog, smog, smokes, clouds, rain storm, winds, cared natural obstructions.

The humidity, intensity of light, wind speed and temperature were continuously monitored and studied accurately with the help of Data logger, Lux meter, Anemometer and Thermal gun. The

systematic record of all these physical parameters at various locations within the temple. The final plan was worked out accordingly, to observe full-fledged Kirnotsav.

Printed from

THE TIMES OF INDIA

Kirnostav festival: Sun rays reach till waist of the deity at Mahalaxmi

TNN | Feb 1, 2017, 06.02 AM IST



KOLHAPUR: The first day of second Kiranotsav festival on Tuesday saw rays of the sun reaching till the waist of the deity at Mahalaxmi temple.

In another development, the Mahalaxmi Kiranotsav Marg Nischitikaran Samiti came up with a fixed map of the sun's movement and will soon submit it to the town planning department of the Kolhapur Municipal Corporation (KMC).

The Mahalaxmi temple is built in such a manner that sun rays reaches in sanctum sanctorum twice a year— Uttarayan (sun moving towards North) and Dakshinayan (sun moving towards South). The ongoing festival will culminate on February 2.

On Day 1 of the festival, more than 10,000 devotees attended the festival. However, for the past few years the sun rays have not been covering entire deity due to various reasons, including air pollution.

Member of the Mahalaxmi Kirnostav Marg Nischitikaran Samiti and environmental activist Uday Gaikwad said, "The town planning department of KMC had formed a committee to study the path of sun's movement and asked to finalise a path. We are in the last leg of fixing the path. We will soon submit the maps to the town planning department."

Milind Karanjkar, a researcher at Vivekanand College, said, "We have been mapping and testing intensity of sun rays since the last two days. We registered that high intensity of sun rays is reaching the temple. We would sit together with temple management and suggest measures to prevent deviations in its path."

Following tasks are undertaken to solve the above problems/difficulties.

1) Considering the human interference, the major obstacle; the initial steps are taken to convince people to observe and see the phenomenon live on screen, placed in the temple premises. This was only possible with the cooperation and arrangement made by Shri. Mahesh Jadhav, Chiarman, Paschim Maharashtra Devasthan Samiiti, Kolhapur and his official team. Further he made the live streaming of the event through website of devasthan samiiti, local TV channels and other electronic medias to avoid crowd inside the temple. Subsequently, this help reducing the amount of dust particles, humidity, temperature, physical obstruction by the people. The illumination intensity is dramatically improved.

2) Only optimal no. of people (20) allowed including print and electronic media persons, office staff of the devasthan samiiti and priests inside the temple during the kirnotsav time. Paschim Maharashtra Devasthan samitii request to stake holders to remove the water tanks on the buildings and apartments, temporarily extension shades advertising boards on the shop, some electricity cables on the way, trees on the path are trimmed. It is seen that the sun rays travel in proper way and reaches to deity at the proper place and the kirnotsav is successfully complete both in the 'Dakshinayan' and 'Uttarayan' properly and required lux level is obtained.

3) All the incandescent lamps high mask lamos are replaced by LED to reduce power consumption and ambient temperature.

4) The subsequent reflection came due to vitrified tiles, fitted in the temple, obstruct resultant intensity. The path of the sun rays is covered by cloth mats to reduce reflection of light to avoid light interference. This minimizes the loss of sunrays during their journey. The intensity, temperature, humidity, wind speed and direction of sunrays are monitored during kirnotsav.

Conclusion: (Kirnotsav, during the ‘Dakshinayan’ of Sun)

In the current situation study/results indicates that if environment is clear, no dense clouds in the sky, no dust particles, no pollutants, and if only optimal no. of people (maximum 20) enter inside the temple during the period of Kirnotsav i.e. from 5.00 pm to 5.55 pm (‘Dakshinayan’ of sun), the sunrays festival called as Kirnotsav succeeds for five days.

After successful study of kirnotsav, during the ‘Dakshinayan’ of the sun, we noticed /found that festival occurs during November 9, 10, 11, 12 and ends on November 13. i.e after two days of previous dates announced (09 November to 11 November).

Further as per our observations the study shall be extended up to 14, and 15 Nov. to check the sun rays reaches or not on deity. If above mentioned factors are up to the required mark the period of ‘Dakshinayan’ Kirnotsav may be ends/last on 15 Nov. 2020. (up to seven days)

Conclusion: (Kirnotsav, during the ‘Uttarayanyan’ of Sun)

In the current situation the study/results indicates that if environment is clear, no dense clouds in the sky, no dust particles, no pollutants, and if only optimal no. of peoples (maximum 20) enter inside the temple during the period of Kirnotsav i.e. from 5.15 pm to 6.20 pm (“Uttarayanyan” of sun), the sunrays festival called as Kirnotsav succeeds for five days.

After successful study of kirnotsav, during the “Uttarayanyan’ of the sun, we noticed /found that, festival occurs during January 29, 30, 31, February 01 and ends on February 02. i.e two days early of previous dates announced (31 January to February 1, 2). Further as per our observations the study shall be started from 27 and 28 January to check the sun rays reaches or not on deity. If above mentioned factors are up to the required mark the period of “Uttarayanyan’ Kirnotsav may be up to seven days.

Letter by Shree Mahalaxmi Karveer Nivasini Temple Office



WESTERN MAHARASHTRA DEVASTHAN MANAGEMENT COMMITTEE

पश्चिम महाराष्ट्र देवस्थान व्यवस्थापन समिती

श्रीमहालक्ष्मी करवीर निवासिनी मंदिर ऑफिस
SHREE MAHALAXMI KARVEER NIVASINI TEMPLE OFFICE

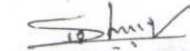
कोल्हापूर. फोन : २५४१७७९ KOLHAPUR. PHONE : 2541779

जावक क्र. :

दिनांक :

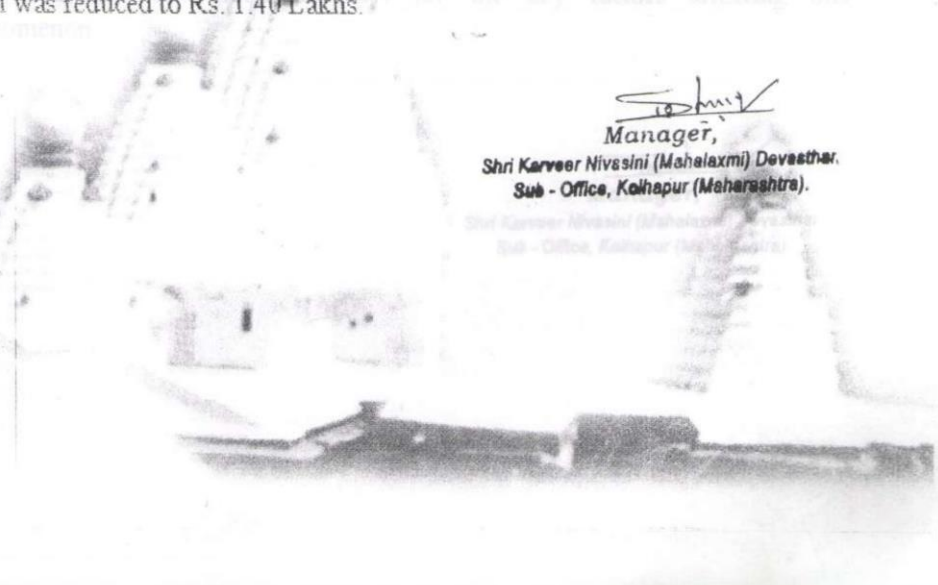
The team led by Dr. Milind M. Karanjkar from Department of Physics, Vivekanand College, Kolhapur is investigating several aspects of environmental pollution and subsequent impact on ambience of Shri. Mahalaxmi temple, Kolhapur. This temple is being visited by several lakhs of devotees every year and is one of the popular and sacred places in southern Maharashtra.

It was observed by the team that inside the Garbhkuti, the average values of temperature and humidity were 36.1°C and 84% respectively. There were several incandescent and florescent lamps installed in the temple, which were causing rise in temperature and humidity. The power consumption was also substantial. However, as per the suggestion of the team, the temple committee installed LEDs. LED is the latest lighting technology, which helps in keeping the surrounding temperature low as it is a cold source of light. Due to LED lights installation both the temperature and humidity were brought down substantially to 32.5 °C and 72% respectively. This results into the creation of good ambience in Garbhkuti that help Pujari's and devotee's and all other people who visit the temple. Similarly the LED installations have caused substantial reduction in power consumption. The electricity bill of Rs. 1.65 Lakh was reduced to Rs. 1.40 Lakhs.


Manager,

Shri Karveer Nivssini (Mahalaxmi) Devasthan,
Sub - Office, Kolhapur (Maharashtra).

Shri Karveer Nivssini (Mahalaxmi) Devasthan,
Sub - Office, Kolhapur (Maharashtra).





WESTERN MAHARASHTRA DEVASTHAN MANAGEMENT COMMITTEE

पश्चिम महाराष्ट्र देवस्थान व्यवस्थापन समिती
श्रीमहालक्ष्मी करवीर निवासिनी मंदिर ऑफिस
SHREE MAHALAXMI KARVEER NIVASINI TEMPLE OFFICE

कोल्हापूर. फोन : २५४१७७९ KOLHAPUR. PHONE : 2541779

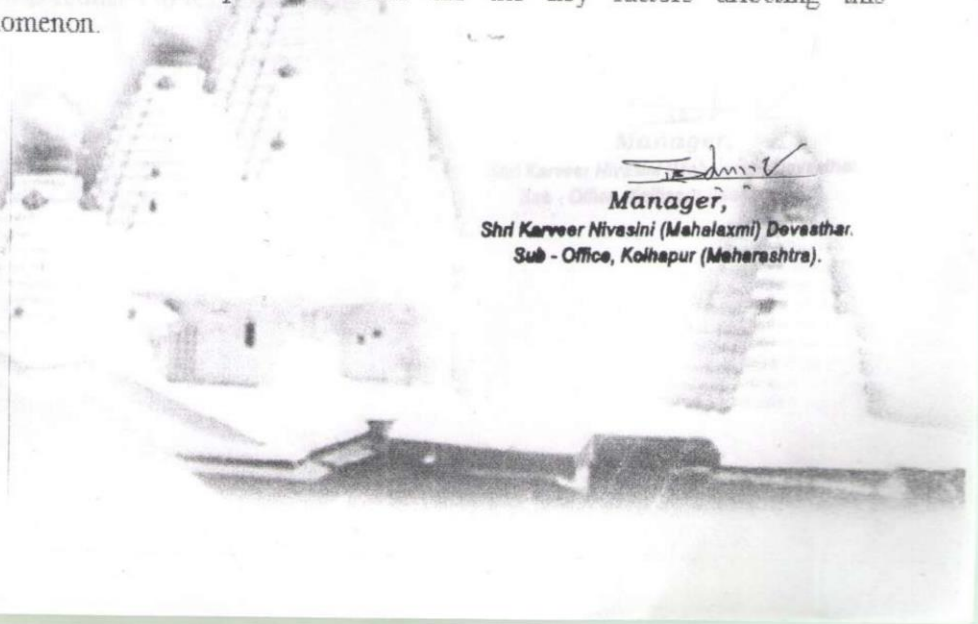
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दिनांक :

The team led by Dr. Milind M. Karanjkar from Department of Physics, Vivekanand College, Kolhapur is investigating several aspects of environmental pollution and subsequent impact on ambience of Shri. Mahalaxmi temple, Kolhapur. This temple is being visited by several lakhs of devotees every year and is one of the popular and sacred places in southern Maharashtra.

"Kiranotsav" is one of the most unique and an interesting festival celebrated twice a year (in the month of November and January-February). During this period at the time of sunset, rays travel from Mahadwar-Garud Mandap-Ganapati Mandir-Kasav Chowk-Pitali Umbaratha-Khajina Chowk-Garbhagriha-Garbhkuti-Godess Mahalaxmi, stepwise. This takes about 20 minutes for rays to travel from Mahadwar to Godess Mahalaxmi. This depends on sun's altitude and azimuth positions. The team narrates the detailed scientific information about this festival to all the devotees.

However, recently there was some problems in "Kiranotsav", due to which the festival did not take place properly. The reasons behind this incomplete "Kiranotsav" festival are studied by this team. It is observed that some obstacles and pollution level are the key factors affecting this phenomenon.



Manager,

Shri Karveer Nivasini (Mahalaxmi) Devasthan.
Sub - Office, Kolhapur (Maharashtra).

Photographs of Kirnotsav (2018 – 19)



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Prof. Dr. Milind Karanjkar, Head, Department of Physics, Vivekanand College, Kolhapur (02/02/2018)



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Miss. Sujata Patil, Student (B.Sc. – I), Vivekanand College, Kolhapur (Autonomous) (02/02/2018)



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Devotee of Ambabai on Kirnotsav 2018 (02/02/2018)

Newspaper Cuttings (2018 – 19)



Joy & thrill as sunrays cover entire idol of Mahalaxmi

TIMES NEWS NETWORK

Kolhapur: Sunrays covered the entire idol at the Mahalaxmi temple on Monday during the Kirnotsav (festival of rays) after a number of years on Monday leaving a large number of devotees excited and the temple authorities happy.

Confirming about the development, Paschim Maharashtra Devsthan Samiti (PMDs) chairman Mahesh Jadhav said that due to rising pollution, illegal hoardings

KIRANOTSAV

and encroachment over the past few years, the sunrays did not cover the entire idol.

"However, this year, with the help of researchers and Kolhapur Municipal Corporation (KMC), we managed to take a few precautionary steps to avoid the unnecessary obstacles. This has resulted in the sunrays entering the sanctum sanctorum without any hindrance on Monday," he said.

Kirnotsav (festival of rays)

Kirnotsav is celebrated when the sun rays fall directly on the deity's idol at the time of sunset. It is a biennial festival that takes place between Nov 9 and 12, and between January 31 and February 2



is celebrated when the sunrays fall directly on the deity's idol at the time of sunset. It is a biennial festival that takes place usually between November 9 and 12 and between January 31 and February 2.

Jadhav said that a KMC engineer's survey in 1947 had found that Kirnotsav should be observed for five days to wit-

ness the phenomenon of the sunrays covering the entire idol. The researchers have also given their nod for the same.

"This year, we observed it for five days. Next year, we will be observing it for five days officially. It will start from January 30 and end on February 3," he added.

Milind Karanjkar, associate professor of astrophysics at the city-based Vivekanand College, who has undertaken a study of sunrays, its intensity and possible hurdles to the Kirnotsav told TOI that the intensity of the rays was quite good on Monday resulting in the rays covering the entire idol.

"The rays should have an intensity of 10 to 15 lux for the Kirnotsav to happen properly. Though they could not measure the readings inside the sanctum, it must be around this intensity. The rays covered the idol at 5.48pm and stayed there for around 60 seconds. The phenomenon of Kirnotsav was certainly outstanding," he said.

Times of India dated 13/11/2018

THE TIMES OF INDIA, KOLHAPUR
MONDAY, NOVEMBER 12, 2018



Clouds play spoilsport on third day of Kiranotsav

TIMES NEWS NETWORK

Kolhapur: The third day of the Kirnotsav (festival of rays) was marred by a last-minute obstacle in the form of clouds. Cloudy skies weakened the intensity of the sun's rays and eventually the rays only lit up the idol at the Mahalakshmi Temple here up to its waist. The three-foot idol in black stone at this eighth century temple sees a festival of the sun's rays twice a year, when rays fall directly on the idol and light it up.

Last year, on November 11, Kirnotsav occurred

completely – the sun rays covered the whole deity and fell on its face too. This year, although the district administration had taken special care to remove all obstructions that would impede the rays of the sun, the idol was

MAHALAXMI

lit up only up to the waist.

Milind Karanjkar, head of the department of physics at Vivekanand College, said: "The actual angle of the sun rays has not changed. The rays get deflected by thick pollutant particles in the air; intensity of sun rays is affected

by clouds too. The rays should have an intensity of 10 to 12 lux for Kirnotsav to happen properly. But the registered intensity was 2 lux this year, at the sanctum."

He said pollutants were also on the rise, especially after Diwali firecrackers. Also, it is the main square in the city, and quite busy. Humidity level is high due to the water tanks in the buildings nearby.

Burning of crop residue in the nearby village should be stopped to ensure normal path of sun rays before the start of the festival, a study done earlier had said.

Times of India dated 12/11/2018

Sunrays cover waist of deity on Day 2 of Kiranotsav

Rahul Gayakwad

TIMES NEWS NETWORK

Kolhapur: The second day of Kiranotsav festival on Saturday saw sunrays reaching above the waist of the deity at Mahalaxmi temple.

According to researchers, cloudy conditions led to weak intensity of rays or else the rays could have covered the face of the deity.

On the first day, i.e. Friday, rays of the sun reached till the knee level of the idol at Mahalaxmi temple. "It is expected that the rays would cover the entire idol by Sunday. Hence, huge crowd is likely to gather at the temple to witness the spectacle," an official from Pashim Maharashtra Devsthan Samiti (PMDS) said.

Milind Karanjkar, associate professor of astrophysics at the city-based Vivekanand College who undertook a study of sun rays, said, "We measured the intensity of rays in the sanctum sanctorum, it was very weak by the evening. It was just 1 lux and to cover the entire idol it should be more than 8 lux at least."

He added that the unexpected cloud cover played a



The sunrays are expected to cover the entire idol by Sunday

spoilsport with addition to the pollutants from various sources. "But still we are sure that on Sunday, the devotees will get a glimpse of the sunrays covering the entire idol," Karanjkar said.

He added that since the past few years, the festival of rays has been affected to an extent mainly because of higher humidity, air pollu-

tion and untimely cloud formation on the horizon that disperses the light or blocks it from entering the temple.

Kiranotsav (festival of rays) is celebrated when the sunrays fall directly on the deity's idol at the time of sunset. It takes place twice a year — between November 9 and 12, and between January 31 and February 3.

SUNDAY

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Air pollution mars Kirnotsav at Mahalaxmi

TIMES NEWS NETWORK

Kolhapur: On the first day of the three-day Kirnotsav (festival of rays), the rays of the setting sun at 5.45 pm on Friday reached above knee level of the three-foot-high idol at Mahalaxmi Temple. The shaft of light on the idol could be observed for a few minutes. Experts say the rays will cover the entire idol on the next two days. Although illegal structures and hoardings were removed by the district administration to clear the path of the sun rays to the idol, air pollution poses a problem still.

Kirnotsav is celebrated when the sun rays fall directly on the idol at sunset, and takes place twice a year – between November 9 and 12 and between January 31 and February 3. Mahesh Jadhav, chairman, Pashchim Maharashtra Devasthan Samiti (PMDS), told TOI, "The first day of the festival saw a great response from devotees. The rays reached up to slightly above the knee and we expect them to reach the face or



Rahul Gayakwad

Kirnotsav is celebrated when the sun rays fall directly on the idol at sunset, and takes place twice a year – once between November 9 and 12 and between January 31 and February 3

cover the entire idol within the next two days."

He said that for devotees' convenience, three LED screens were installed at the Mahalaxmi Temple premises, which

will continue to function throughout the festival. Jadhav said there are still a few obstacles that the sun's rays face. The district administration had earlier demolished struc-

tures that had come up illegally in the area that obstructed the sun's rays from falling on the idol.

"Pollutants from firecrackers also pose obstruction. It

The administration had earlier demolished structures that had come up illegally in the area that obstructed the sun's rays from falling on the idol

was also cloudy on Friday, and that affects Kirnotsav," he said. Milind Karanjkar, associate professor of astrophysics at the city-based Vivekanand College, who has undertaken a study of the sun rays, its intensity and possible hurdles, said pollutants are still in the atmosphere after firecrackers were burst for Diwali, causing obstruction to sun rays. The intensity of the rays will get better in coming days, he said.

Hundreds of devotees arrive during the festival to get a glimpse of the architectural marvel, where the rays steadily reach the sanctum of the temple on particular days of the year. The temple is believed to date to the eighth century.

Times of India dated 10/11/2018



Sunrays touch idol's shoulder

TIMES NEWS NETWORK

It was a perfect start for the season's second Kirnotsav as the rays reached up to the shoulder of the deity on Wednesday. According to researchers, Uttarayan, which marks the end of winter, makes the day longer and therefore the intensity of light was also good on the first day of the festival.

Milind Karanjkar, associate professor of astrophysics at a city-based college has also undertaken a study on sun's rays, its intensity and possible hurdles. He said, that unlike the winter season's Kirnotsav where the intensity of light could measure well below 15 lux, on January 31, the intensity was about 67 lux at the sancturum of the Mahalaxmi temple.

The start of the summer season and a clean atmosphere have led the sun's rays to touch the idol, he said. "For the next few days, we might see the rays covering the entire idol which has happened only twice in last five years," he said.

Hundreds of devotees thronged the temple to get a glimpse of the architectural marvel where rays steadily reach the sancturum of the temple on particular days of the year. The festival is celebrated when the sun rays fall directly on the idol at the time of sunset. It takes place twice a year -- between November 9 and 12 and between January 31 and February 3.

It is to be noted that earlier in winter, researchers had advised authorities of the municipal corporation to initiate various preventive activities so that the rays of the sun are not obstructed.





One Page Report

“Dissemination of Education for Knowledge, Science and Culture”
- Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Autonomous)


Department of Physics



One Page Report

Name of the Department	Department of Physics																
Name of the Activity	“A scientific Study of Kirnotsav in Mahalaxmi (Ambabai) Temple, Kolhapur during ‘Dakshinayan’ and ‘Uttarayan’ of Sun” (2018 – 19).																
Date / Duration	09 – 12 November 2018 and 31 January – 03 February 2019																
Aims and Objectives	Mahalaxmi (Ambabai) temple built in an ancient time is an excellent architectural design with natural stones. Kimotsav at Mahalaxmi (Ambabai) temple, Kolhapur, Maharashtra is one of the most awaited festivals for a people from Maharashtra and other states. It is also becoming popular amongst people from other countries.																
No. of Beneficiaries	<table border="1"><tr><td rowspan="2">Teachers</td><td>Male</td><td>01</td><td rowspan="2">01</td></tr><tr><td>Female</td><td>-</td></tr><tr><td rowspan="2">Students</td><td>Male</td><td>-</td><td rowspan="2">01</td></tr><tr><td>Female</td><td>01</td></tr><tr><td colspan="3" style="text-align: right;">Total</td><td>02</td></tr></table>	Teachers	Male	01	01	Female	-	Students	Male	-	01	Female	01	Total			02
Teachers	Male		01	01													
	Female	-															
Students	Male	-	01														
	Female	01															
Total			02														
Expenditure and Fundings	College Funds																
Brief Discussion	During ‘Dakshinayan’ and Uttarayan of sun the sun rays’ traverse about 200 meters, from Mahadwar arch to idol goddess Mahalaxmi (Ambabai). During ‘Dakshinayan’ of Sun (November 9 to 12) and Uttarayan of Sun (January 31 and February 1 to 3) sun rays spectacularly illuminates an entire path, that dominates reddish golden sunrays stemming from longer wavelength of solar spectrum (650-700 nm).																
Outcomes	The current study indicates that, due to rising pollution, illegal hording and encroachment over the past few years, the sun rays did not cover the entire idol. However, this year with the help of Kolhapur Municipality Corporation, we manage few precautionary steps to avoid unnecessary obstacles and encroachments which resulted on into sun rays to cover entire idol at Mahalaxmi Temple on 12 th November 2018.																




HoD
HEAD
DEPARTMENT OF PHYSICS
VIVEKANAND COLLEGE, KOLHAPUR
(AUTONOMOUS)