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SIGNIFICANT ANOMALOUS ENHANCEMENT OF SECONDARY RADIATION FLUX DURING ALIGNMENTS (STRAIGHT LINE) OF CONSTELLATION CAPRICORN, PLANET SATURN, AND MOON ON OCTOBER 5, 2022 AT UDAIPUR (RAJASTHAN), INDIA.

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Abstract: An experimental study was conducted to observe secondary radiation flux at Udaipur (27° 43' 12.00" N, 75° 28' 48.01" E), India during the astronomical event alignment of Constellation Capricorn, Planet Saturn, and Moon. This Astronomical event happened on October 5, 2022, between time 20.30 IST to 21.00 IST. We used an efficient scintillation detector and cadences of data were collected at intervals of half an hour. Dates of observations were October 2, 3, 4, 5, 6, 9, 10, 11, 12, 14, 17, 18, 19, 20 (2022). Analyzed data revealed a significant enhancement of secondary radiation flux on October 5, 2022. We interpret such findings based on the alignment of Constellation Capricorns, Planet Saturn, and Moon. Due to this combined gravitational lensing, gravitation pull became significant. Therefore, more bent radiation flux entered the atmosphere of Earth, hence the formation of more secondary radiation flux in the atmosphere of Earth during this Astronomical event.

Analyzed data showed integrated secondary radiation flux counts for half an hour duration on October 2- 244822, 3- 242377, 4- 248710, 5- 1445793, 6- 249377, 9 -251966, 10- 248811, 11- 256935, 12- 250589, 14- 250009, 17- 248129, 18- 248902, 19- 247771, 20- 247577

This is a unique and first-time observation during the alignment of (Straight line) of three celestial objects, Constellation Capricorns, Planet Saturn, and the Moon.

Keywords: Primary cosmic radiation, Constellation Capricorn, Planet Saturn, Moon, Secondary radiation flux, combined gravitational lensing, combined gravitational pull.

1 Introduction

Radiation travels at nearly the speed of light known as cosmic radiation. The composition of this radiation is about 89% protons, 10% of the nucleus of helium, and about 1% of other heavier elements^[1-3]. Primary cosmic radiation has an Energy range of 10^9eV - 10^{20}eV or more^[4]. Another type of radiation coming from the Sun is called solar radiation (SR). It was given by Simpson, J. (1983)^[5] that cosmic radiation has different chemical abundances with respect to their energy. When radiation (Cosmic and solar) strikes on atmosphere of the Earth there is the production of secondary particles known as secondary radiation^[6]. Hence there is the formation of a shower of secondary particles in the atmosphere^[7]. This shower comes down in the atmosphere and the

formation of secondary particles increases rapidly [8-9]. Produced Secondary particles have pions, muons, neutrinos, gamma radiation, electrons and positrons. These are able to reach the Earth's surface [10]. Secondary radiation has three components: electromagnetic component, nuclear fragments hadronic component, and muonic-neutrinos component [11-13]. On the surface of Earth secondary radiation flux can be detected using an appropriate detector [14, 15]. It was observed experimentally that when radiation passes near massive objects then bends due to the gravitational field of the object [16-18]. Astronomical objects may be Stars, galaxies, or a cluster of galaxies.

2. Celestial events and radiation flux

Many research studies were performed during astronomical event solar eclipse to observe radiation flux [19-28]. In these research studies variations of radiation flux were observed. Lunar eclipse studies conducted and observed variations of radiation flux [29-32]. Using scintillation counter moon phases experimental study was conducted in the month of September 2000. Unusual variation of radiation flux was observed in this experimental study [33]. An experimental study of the celestial event Venus transit on June 6, 2012 at Udaipur was conducted, and a variation of secondary radiation flux was observed [34]. Comet Hyakutake study has been planned to see the effect of comet in the sky and observed unusual variations of radiation flux in the energy spectrum. Specific energies of about 1.127 MeV, 2.29 MeV, and 3.66 MeV were observed in this study [35]. Also, other research studies were carried out for celestial body comet [36-41]. During the transit of the Sun across different constellations many experimental studies were carried out and observed variations of radiation flux [42-45]. Jupiter and Saturn great conjunction on December 21, 2020, an experimental study was conducted, and about a 2% decrement in radiation was observed [46]. A change of radiation flux was observed during the change of angular position of the Sun and planet Venus in space with the presence of the constellation Pisces in the sky in the month of March 2021 [47]. The change of Position of the Moon in the Sky research study was conducted month of November 2020 and observed variation in radiation flux [48]. The closest approach of Mars towards Earth on October 6 & 7, 2020, Mars at opposition on October 13, 2020, and the transit of the Moon across different constellations and planets experimental studies were done in the month of October 2020 [49]. For the astronomical event Closest approach of Jupiter towards Earth, an experimental study was carried out in a month in the month of September 2022 using a ground-based NaI (TI) scintillation detector. Analyzed data revealed a significant enhancement of energy of about 1.5 % of secondary radiation flux (SRF) in comparison to other normal dates (Unperturbed condition) [50]. To observe secondary radiation flux on the surface of Earth during perturbed and unperturbed conditions. The Full Moon astronomical event was experimentally observed on October 13, 2022, using a ground-based NaI (TI) scintillation detector. An enhancement in secondary radiation flux of about 2% was recorded [51].

In all of such studies, Variation of radiation flux was observed. During different celestial events and conditions happening in the sky, these events have modulated radiation flux. Therefore, after being motivated by all the above experimental studies we conducted this experimental study to observe secondary radiation flux energy.

3 Methodology

The scintillation counter system of Nucleonix make (SD 152 F) flat type (Figure 1) used to detect the secondary radiation flux. The size of this detector [NaI (TI)] crystal is 2" x 2". It is optically coupled with a photomultiplier tube. Then 1k multichannel analyzer (MC 1000 with 1024 channels) of Nucleonix make is connected. It has a high voltage and shaping amplifier. For this experimental study, the Scintillation counter system was kept open to collect the counts as a function of time at Udaipur (27° 43' 12.00" N, 75° 28' 48.01" E) (Rajasthan) India. Data were collected for half an hour on dates October 2,3,4,5,6,9,10,11,12,14,17,18,19 and 20 (2022) For calibration of the scintillation detector we used standard source Co⁶⁰(Figure 2). The applied voltage on the detector was 390 volts with a gain of 30 on all observation dates. This set of values i.e., voltage and gain were kept constant.

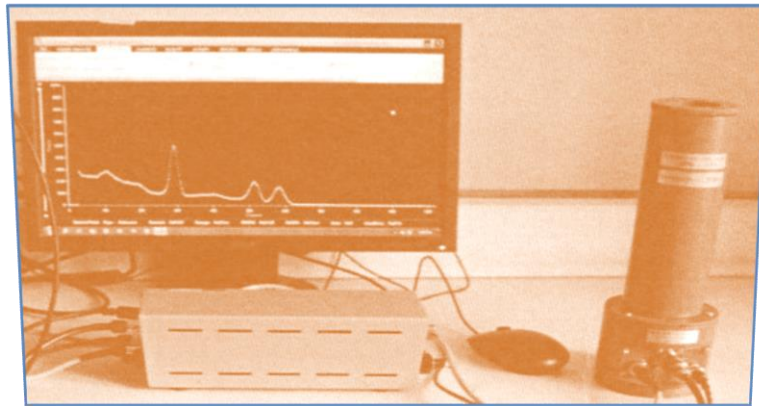


Figure 1 (Scintillation Counter System)

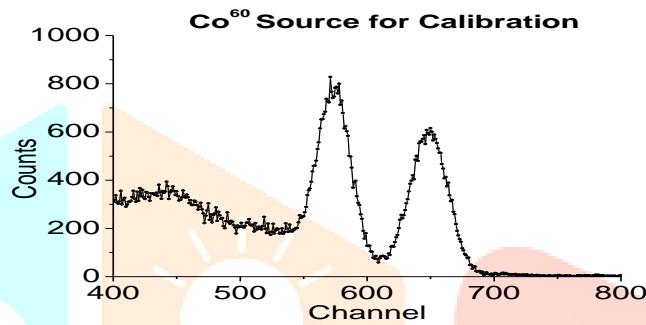


Figure 2 (Cobalt source Peaks)

4 Results and discussions

Data were collected for half an hour on dates October 2,3,4,5,6,9,10,11,12,14,17,18,19 and 20 (2022) in the evening. On date October 5, 2022, there was an astronomical event. As depicted in the panels of figures 3,4 and 5 the secondary radiation flux.

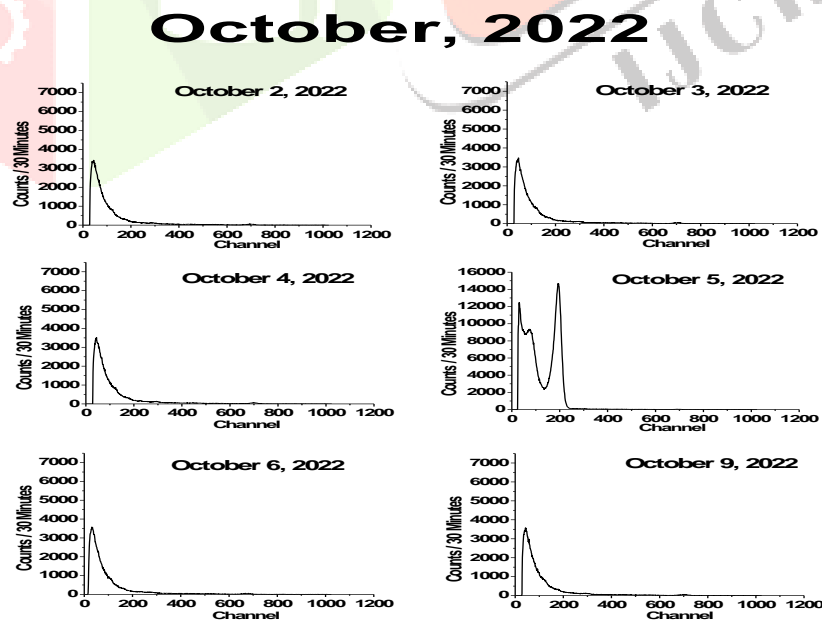


Figure 3 (Panels of secondary radiation flux)

October, 2022

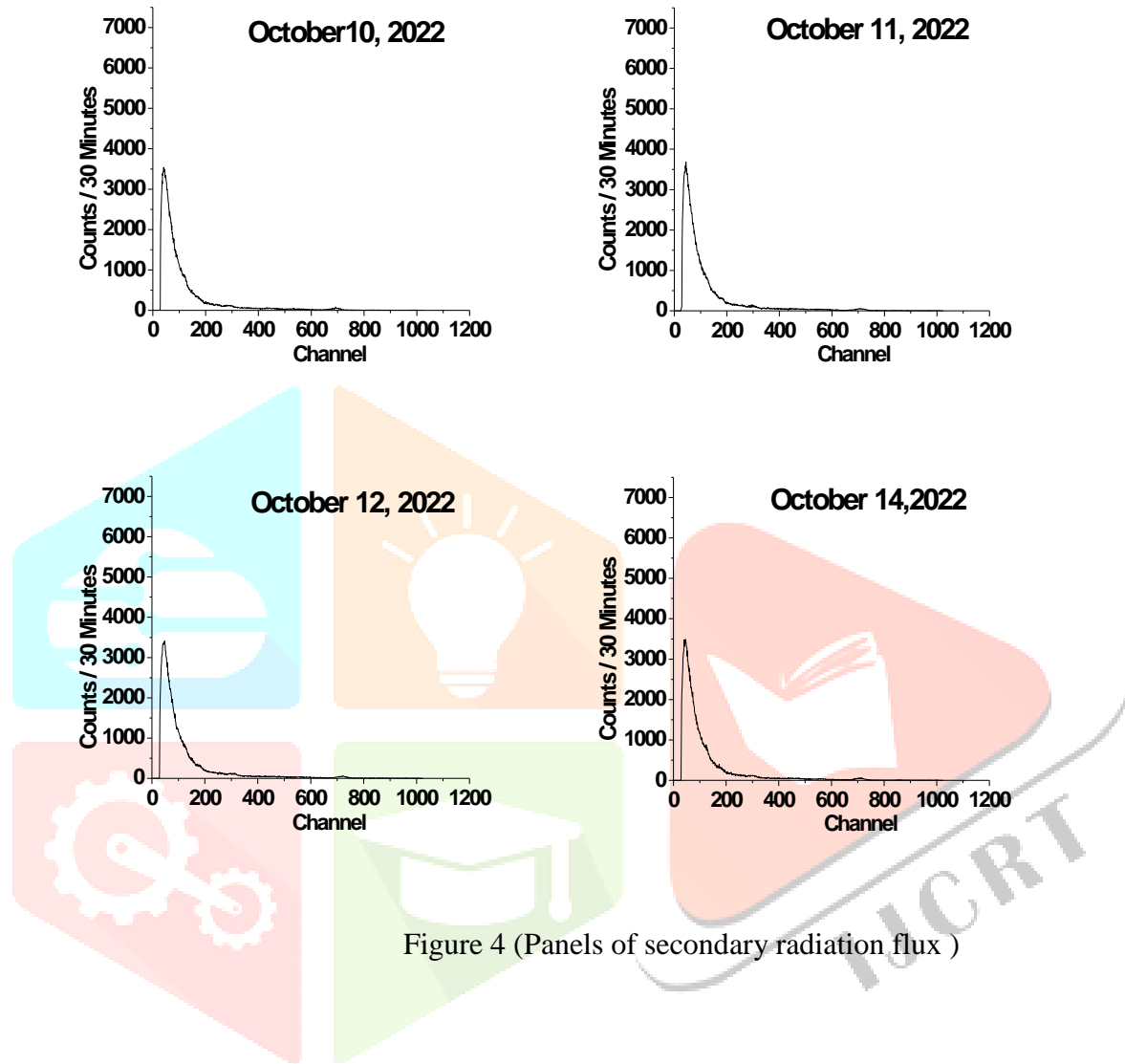
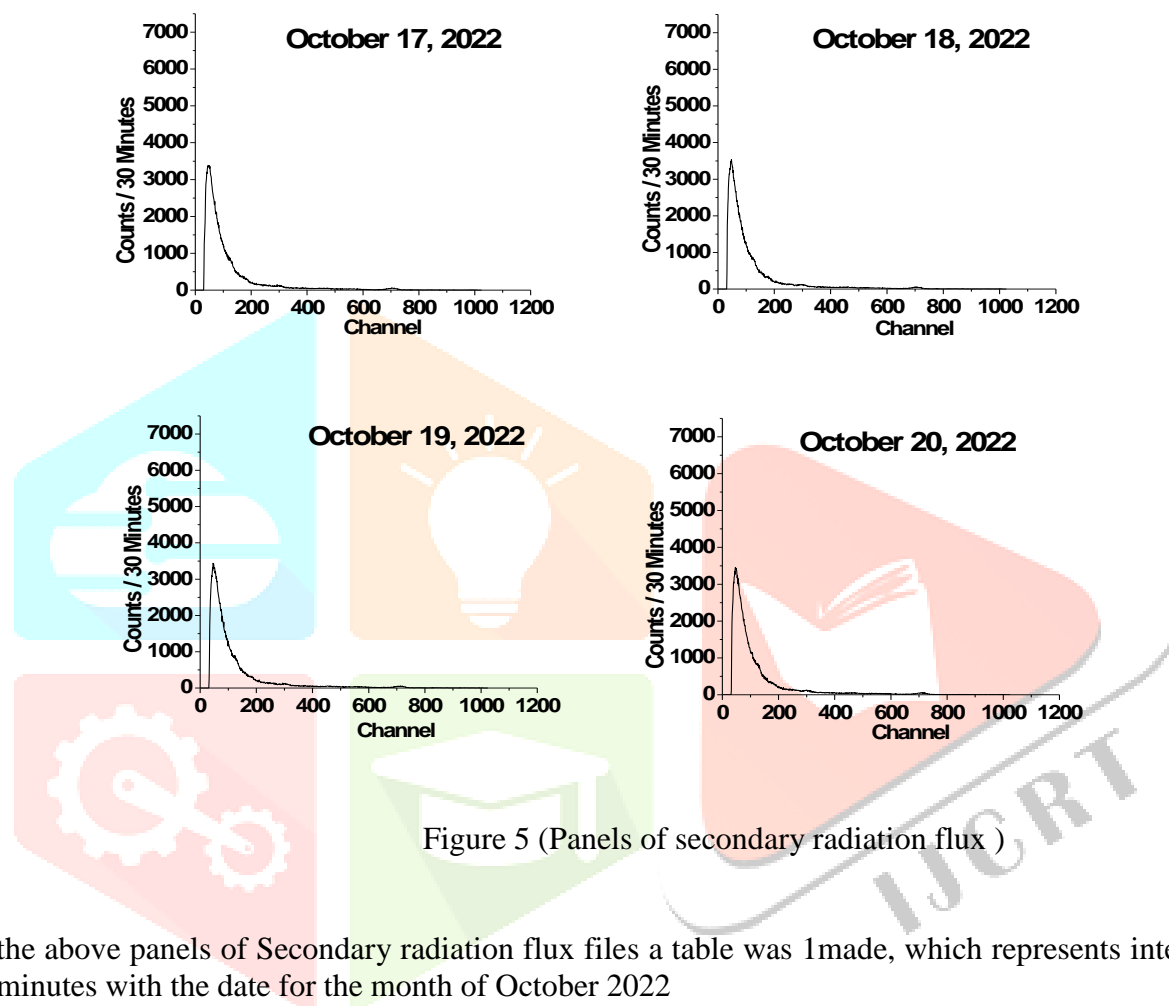


Figure 4 (Panels of secondary radiation flux)

October, 2022



Using the above panels of Secondary radiation flux files a table was made, which represents integrated counts for 30 minutes with the date for the month of October 2022

Sr. No.	Date	Integrated Counts
1	2	244822
2	3	242377
3	4	248710
4	5	1445793
5	6	249377
6	9	251966
7	10	248811
8	11	256935
9	12	250589
10	14	250009
11	17	248129
12	18	248902
13	19	247771
14	20	247577

Table 1 (Integrated counts with date)

Using table 1 we made Figure 6 between date and integrated counts

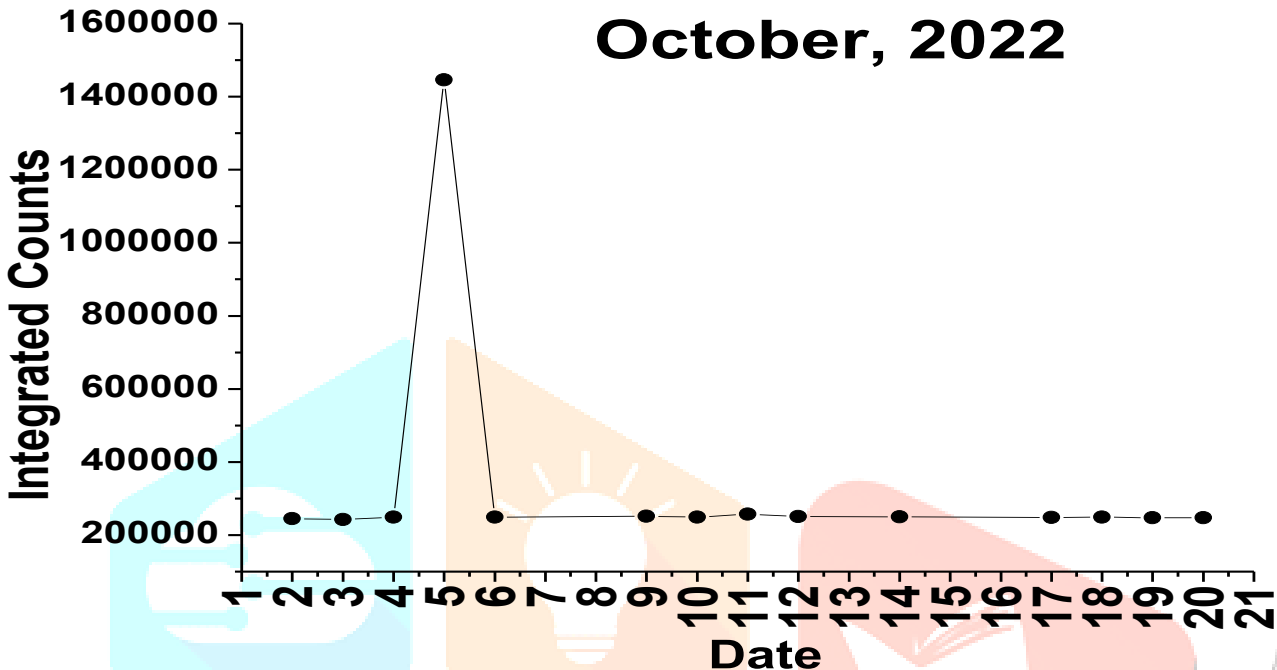


Figure 6 (Integrated Counts With date)

Figure 6 shows that on date October 5, 2022, we got an enhancement in secondary radiation flux. On October 5 between time 20.30 IST to 21 IST the moon passes across the constellation Capricorn, Planet Saturn. All three celestial objects came in a straight line with respect to Earth.

5 Conclusions

Figure 6 shows anomalous enhancement of secondary radiation flux between time 20.30 IST to 21.00 IST. During this time period, all three celestial objects came in a straight line (Constellation Capricorn, Planet Saturn, and Moon) on date October 5, 2022. In a previous experimental study, I also observed an abrupt change in secondary radiation flux during the event Phases of the Moon in the month of September 2000 [33]. On September 9, I observed abrupt change which was not observed in other observation dates in that experimental study with the help of a scintillation counter system. On this date Uranus was only three lunar diameters above the location of the Moon in the constellation of Capricorn, consequently gravitational lensing and pulling effect was significant by the Uranus and Capricorn constellation along with the Moon. This was a unique and new observation the first time we reported during Phases of Moon for the month of September 2000 using a scintillation counter. Also, many experimental studies were conducted to observe variations of secondary radiation flux at the surface of the Earth during the transit of the Sun across different constellations (Pareek, D. *et al.* 2022; Pareek, D. *et al.* 2021; Purohit, P. *et al.* 2021; Pareek, D. 2022).

In previous experimental studies (Pareek, D. *et al.* 2022) [42] observed variation of SR flux during the transit of the Sun across constellations Libra constellation in the month November 2018 and Virgo constellation in month September, 2019 at Udaipur. As a function of time data were collected using a ground-based NaI (TI) scintillation detector. The results of this study revealed that in the month of November 2018, secondary radiation flux decreased from 13 November to 20 November. On date November 13 the Sun was in the constellation Libra while on another date of observations, the Sun was shifted away from this constellation, therefore decreased secondary radiation flux was observed. For the Month September, 2019 we started observation from 4 September and secondary radiation flux increased. From 4 September onwards the sun was approaching toward Virgo constellation.

Another research experimental study (Pareek, D. *et al.* 2021) [43] was conducted on November 2, 2020, when the Sun was approaching towards Libra Constellation. On date November 12 the Sun was in the constellation Libra, and we reported the highest counts in this experimental study.

In the research study (Purohit, P. *et al.*, 2021), [44] cadences of data were collected at intervals of half an hour. The data files were stored in the computer for an hour duration on January 8, 9, 11, 13, 14, 17, and 18. The objective of this study is to observe secondary gamma radiation flux during transit of the Sun across the constellation Sagittarius. Analyzed data reveals significant variation in secondary gamma radiation flux (SGR). On the date January 8 the Sun was in the constellation Sagittarius and we observed the highest counts in this study. Further on date January 14 we again observed a slight increase in the counts. On this date five Celestial objects close to each other.

An experimental study was conducted during the transit of the Sun across constellations Capricorns and Aquarius in the month of February 2021 (Pareek, D., 2022) [45] using a ground-based NaI (TI) Scintillation detector. Data files were stored in the computer for half an hour duration from time 17.00 IST to 17.30 IST on the dates February 9, 11, 12, 13, 15, 16, 17, and 19. Analyzed data showed that on February, 9 there were the highest counts in this experimental study. On this date, the Sun, planets Jupiter, planet Saturn, Planet Venus were in the constellation Capricorns. Planets Mercury was close to the constellation Capricorns. After February, 9 the Sun started to shift away from this constellation Capricorns and we observed a decrease in counts in the comparison with February, 9.

Such types of effects one can be understood with the help of combined gravitational lensing effect and gravitational pulling effect on the background radiation due to Constellation, Sun, and radiation from the constellation. Collectively these celestial bodies produce more gravitational lensing, pulling, and more radiation bent. Hence, more secondary flux is produced in the atmosphere of the Earth.

In this present experimental study, the condition is almost repeated with respect to phases of the moon experimental study [33] the change is in place of Uranus there is the presence of Saturn in the constellation Capricorn and in both the case Moon was in the Constellation Capricorns.

Significant enhancement in secondary radiation flux we can understand with the help of well-known phenomena combined with gravitational lensing, gravitationally pulling, and radiation from constellation. Between time 20.30 IST to 21.00 IST all three astronomical objects came in a straight line therefore as mentioned above phenomena, more intense radiation flux bent and came in the atmosphere of the Earth. Consequently, formations of Secondary radiation flux more in the atmosphere of Earth.

This is a unique and first-time observation during the alignment of (Straight line) of three celestial objects, Constellation Capricorns, Planet Saturn, and the Moon.

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