

# Unification | 2

54<sup>th</sup> International Physics Olympiad, ISFAHAN, IRAN

22 July 2024 - 1 Mordad 1403



بنام خداوند  
که در آفرینش  
پویانماید  
پویانماید  
پویانماید



# FINALLY HERE!



# UNIFICATION

IPhO 2024 Isfahan, Iran

## No. 2



International Physics Olympiad  
Isfahan Iran 2024

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Prof. Rajdeep Singh Rawat

Prof. Rajdeep Singh Rawat, has been the head of the International Physics Olympiad since 2018. He has also served as the trainer and leader of the Olympiad team of Singapore from 2015 to 2018. His students have won 32 gold, 19 silver, and 3 bronze medals. In an interview with Sara Ghaznavinia, he spoke of the long-term associations that take shape during this competition among the bright students from various countries. These liaisons are maintained through social media, and many students end up going to the same universities. Discussions between team leaders and observers has also given rise to other endeavors and other forms of competition, all with the purpose of promoting physics and science in general. He emphasized the role of universities in designing the appropriate set of problems for this competition, which are at a much higher level than the typical problems students face in their high schools. He also said that he expects the current Olympiad in Isfahan will be as successful as the one previously held here, his only complaint being the speed of Internet!

## SUMMARY OF THE DAY

While teams from other countries are still arriving, those that had already arrived got to familiarize themselves with the campus of the Isfahan University of Technology. Ali-Reza Rafi'i, one of the team guides, said that this orientation process helps the students become familiar with their surroundings and not feel like strangers in their current home. The first destination was the great gymnasium of the university, where the exams will also be held. The students were introduced to the recreational facilities of the university including the swimming pool and the library. They saw the Sheikh Bahai Auditorium where the opening and closing ceremonies will be held. In the lobby of Hotel Hasht-Behesht, the students took photos with their leaders and then walked to the dining halls. The last destination was the memorial monument to the martyrs of the Sacred Defense. The Qatar's team guide, Muhammad-Hadi Furghani, explained the significance of this monument for the academic community of IUT: this was the station from which student volunteers were sent to the front, and as such it is a place where you can feel the force of that love which inspired them to accept the peril of sacrificing their lives in order to secure the future safety and security of their families, friends and compatriots.



# PERSIAN CALLIGRAPHY

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Iranians have always revered written texts. Illiterate villagers are known to pick up pieces of written text and put them inside openings in walls in order to avoid the text being stepped on and disrespected. However, Iranians never had their own script; they have adapted the scripts of other people to write their various languages, including Cuneiform, Aramaic, Syriac, etc. In the 8<sup>th</sup> and 9<sup>th</sup> centuries during the reign of the Tahirid, Samanid, and Saffarid dynasties, the Arabic script was adopted for writing.

The scripts used early on were **Kufic** and **Naskh**. In the 10<sup>th</sup> century, rules were set to bring a measure of discipline to the art of calligraphy. Other scripts were developed to make the scripts meet various needs: geometrical definition of the letters and regularity (**Mohaqqaq**), simplicity and grace (**Rayhan**), clarity (**tholth**), writing books and collections of poetry (**Ta'liq**). In the second half of the 14<sup>th</sup> century, a new script was devised which was called **Nasta'liq** and combined features of **Naskh** and **Ta'liq**. It is compact and can be written quickly. From 15<sup>th</sup> century onward Persians did most of their writing in **Nasta'liq**. The need to write official correspondence even faster, led to the shrinking of some letters and the joining of detached letters. This took the name of **Shekasta** (literally 'broken').

بن آدم اعضای یکدیگرند	بن آدم اعضای یکدیگرند
که در آفرینش زیست یک گوهرند	که در آفرینش زیست یک گوهرند
چو عضوی به درد آورد روزگار	چو عضوی به درد آورد روزگار
دگر عضو را نماند قرار	دگر عضو را نماند قرار
تو کز محنت دیگران بی غمی	تو کز محنت دیگران بی غمی
نشاید که نامت نهند آدمی	نشاید که نامت نهند آدمی

Rendition of the famous poem by Sa'di in **Nasta'liq** (left) and in **Shekasta** (right), the poem reads:

Human Beings are members of a whole  
In creation of one essence and soul  
If one member is inflicted with pain  
Other members uneasy will remain  
If you have no sympathy for human pain  
The name of human you cannot pertain

Another rendition of this same poem in **Shekasta** can be seen on the top right panel on the cover.



In modern times calligraphy has been incorporated into paintings, and used in dress design.









# THE FLAGS

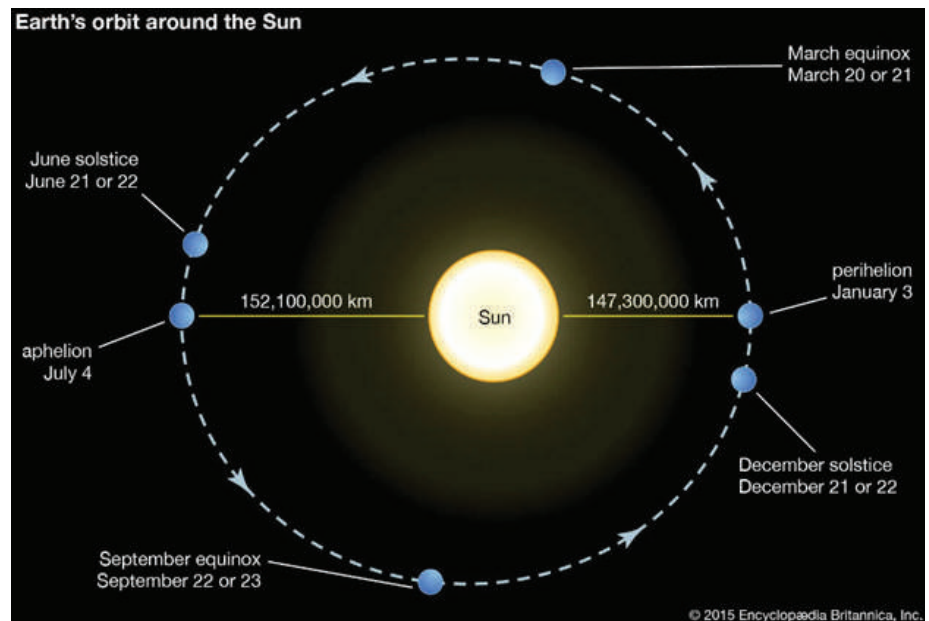
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# THE JALALI CALENDAR

The official calendar of Iran is a solar calendar which is based on astronomical observations. The year in this calendar is the interval between two successive vernal equinoxes. Vernal and autumnal equinoxes are moments in the rotation of the Earth around the Sun, when the Sun crosses the Earth's equator at which point the Earth's rotation axis is perpendicular to the Sun-Earth connecting line. The Earth's speed in its orbit around the Sun depends on its distance from the Sun, therefore it takes 186 days (6 months of 31 days each) to get from the vernal equinox to the autumnal equinox, while it takes 179 days (five months of 30 days each and one month of 29 days) to go from the autumnal equinox to the vernal equinox. However, each year, the vernal equinox transit occurs later than the previous year by an amount less than six hours. These delays accumulate and one day is added to the last month of the year after four (sometimes five) years. In this calendar, the year begins at the moment the Earth passes through the vernal equinox (usually March 21<sup>st</sup>). This moment can occur at any moment of a day and is the same for all people around the world. It is called Norooz, obtained by combining نو meaning 'new' with روز meaning 'day', as it refers to the re-awakening or rebirth of the nature after Winter. Many people living in Western and Central Asia (Afghans, Tajiks, Turkmens, Azeris, Kirgiz people, Kurds, and many others) regardless of their race, ethnicity, language, and religion, recognize and celebrate Norooz.

The present-day calendar of Iran, officially the calendar of Iran since 1910, is based on the Jalali Calendar. The Jalali calendar was devised by the order of Jalaluddin Malik-Shah, the Sultan of the Seljuk Empire, during the years 1075 to 1078, and was named in his honor. The Jalali calendar was itself based on an older Yazdgerdi calendar, itself a solar calendar, but a calendar in which Norooz was not fixed. Sultan Jalaluddin asked the astronomers to draw up a calendar in which Norooz does not move back and forth between the seasons. It has been reported that Omar Khayyam, the mathematician and poet, was among the astronomers who devised this calendar.





# HOW WAS YOUR TRIP?

## Talha Ashraf | Pakistan

Traveling to Iran was a very exciting experience. We, the Pakistani team, first flew to Dubai International Airport where we got to meet the Saudi and Kuwaiti IPhO teams and had two hours to ourselves to explore the airport. After that we were on board a plane straight to Isfahan where we were greeted with great kindness and hospitality of the IPhO volunteers and got to meet our guide. While the trip was extremely tiring since we did not get to sleep through the night leading to it, it was rife with adventure.



## Zehua Wang | China

I think it was pretty long, but it was good. There were no bad things in the trip, so it was fine.



## Kaitlyn Toniman | Indonesia

The flights were exhausting because I didn't get to sleep much, but it was worth it, because when I got here, I was greeted with very nice views.



## Carlos Daniel Chaviano | Cuba

The trip was very good, I don't think there was anything wrong. The travel was quite long. We come from Havana, that is a very large distance. Everything was OK.



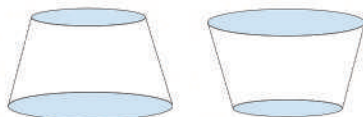
## Mohamad Eid Alakataa | Syria

Hi, I'm Mohamad Eid Alakataa, an ambitious physics student from Syria. Since my arrival in Iran, I was amazed by the work done by the people organizing this important event. It will be an unforgettable experience, I am waiting for the examination with utmost interest, and of course, for the medal!



### Poor Wet Truncated Cone

The pressure exerted by the liquid on the surface results in forces perpendicular to the surface at each point. For our two cases, the force exerted on the liquid on the edges of the plastic sheet is pointing upward for the figure on the left, and is pointing downward for the figure on the right. Therefore, after releasing the vessel, the edges of the truncated cone on the left is pushed upwards and the liquid pours out, while for the truncated cone on the right the edges are pressed against the surface and the water will remain in mechanical equilibrium inside the truncated cone.



scan me!



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Ministry of Education



Islamic Consultative Assembly of Technology

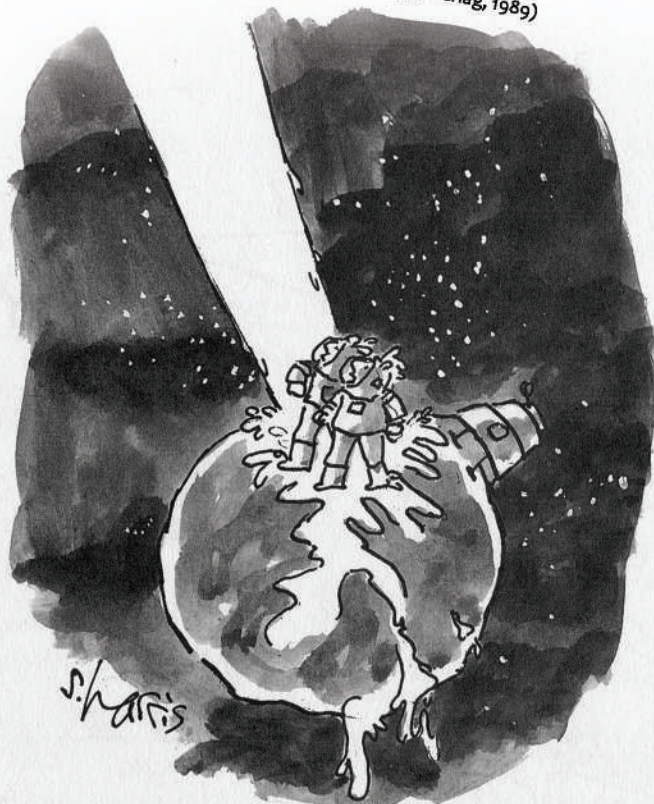


Shahr-e Qods Teacher Training University



Young Scholars Club

Sidney Harris, *Einstein Atomized*  
(Copernicus Springer-Verlag, 1989)



"UP HERE, LIGHT IS NEITHER A PARTICLE OR A WAVE. IT'S A LIQUID."