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Upcoming event

The 13th Conference of EPS will be held at Adama Science and Technology University, Adama on February 15th and 16th , 2019

EPS 2018(12th) National Conference

The 12th National Conference of Ethiopian Physical Society (EPS) was held from February 23 to February 24, 2018 at College of Natural and Computational Sciences, Addis Ababa University (Arat kilo campus). The conference theme was " "The status of Physics education and research in Ethiopia". The conference participants were welcomed while registration was carried out at the 9th floor of graduate building conference hall.

The Chairman of EPS, Dr. Chernet Amente, gave a short introduction about the program and a welcome speech. Subsequently, selected original research papers were presented according to the schedule.

Around 150 participants attended the conference and 20 scientific papers were presented. The conference was successful with the support of different organizations which includes, Ministry of Science and Technology, General Electric, Entoto Observatory and Space Science Research Center, BGI Ethiopia, INDOSAW, and the Department of Physics of AAU. The chairman of EPS acknowledged all the sponsors during his presentation of the annual report of the society.

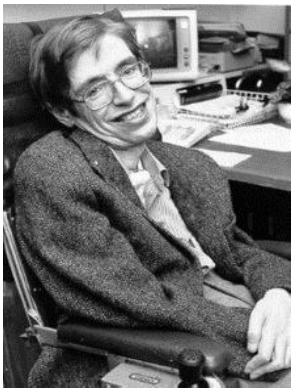
Acknowledgment
EPS is highly thankful to Adama Science and Technology University (ASTU) for hosting the 2019 Annual conference

From the editor

Dear readers, you are invited to publish original research work on the first historic EPS journal (JEPS) free of charge. Please visit the **website** of the society for the detail.

Who is who in Physics:

Stephen William Hawking



Stephen William Hawking (8 January 1942 – 14 March 2018) was an English theoretical Physicist, cosmologist, and author, who was director of research at the Centre for Theoretical Cosmology at the University of Cambridge at the time of his death. He was the Lucasian professor of Mathematics at the University of Cambridge between 1979 and 2009.

His scientific works included a collaboration with Roger Penrose on gravitational singularity theorems in the framework of general relativity and the theoretical prediction that black holes emit radiation, often called Hawking radiation. Hawking was the first to set out a theory of cosmology explained by a union of the general theory of relativity and quantum mechanics. He was a vigorous supporter of the many - worlds interpretation of quantum mechanics.

Hawking achieved commercial success with several works of Popular science in which he discusses his own theories and cosmology in general. His book ”**A Brief History of Time”** appeared on the British Sunday Times best-seller list for a record-breaking 237 weeks. Hawking was a fellow of the Royal Society (FRS), a lifetime member of the Pontifical Academy of Sciences, and a recipient of the Presidential Medal of Freedom, the highest civilian award in the United States. In 2002, Hawking was ranked number 25 in the BBC's poll of the 100 Greatest Britons. In 1963, Hawking was diagnosed with an early-onset slow-progressing form of Motor neuron disease (MND; also known as amyotrophic lateral sclerosis "ALS" or Lou Gehrig’s disease) that gradually paralyzed him over the decades. Even after the loss of his speech, he was still able to communicate through a speech-generating device, initially through use of a hand-held switch, and eventually by using a single cheek muscle. He died on 14 March 2018 at the age of 76, after battling the disease for more than 50 years.

Family

Hawking was born on 8 January 1942 in Oxford to Frank (1905–1986) and Isobel Eileen Hawking (née Walker; 1915–2013) Hawking's mother was born into a family of doctors in Glasgow, Scotland. His wealthy paternal great-grandfather, from Yorkshire, over-extended himself buying farm land and then went bankrupt in the great agricultural depression during the early 20th century. His paternal great-grandmother saved the family from financial ruin by opening a school in their home. Despite their families' financial constraints, both parents attended the University of Oxford, University of Oxford, where Frank read medicine and Isobel read Philosophy, politics and Economics. Isobel worked as a secretary for a medical research institute, and Frank was a medical researcher. Hawking had two younger sisters, Philippa and Mary, and an adopted brother, Edward Frank David (1955–2003).

In 1950, when Hawking's father became head of the division of parasitology at the National Institute for Medical Research, the family moved to St Albans, Hertfordshire. In St Albans, the family was considered highly intelligent and somewhat eccentric; meals were often spent with each person silently reading a book. They lived a frugal existence in a large, cluttered, and poorly maintained house and travelled in a converted London taxicab. During one of Hawking's father's frequent absences working in Africa, the rest of the family spent four months in Majorca visiting his mother's friend Beryl and her husband, the poet Robert Graves.

Primary and secondary school years

Hawking began his schooling at the Byron House School in Highate, London. He later blamed its ”Progressive methods" for his failure to learn to read while at the school. In St Albans, the eight-year-old Hawking attended St Albans High school for Girls for a few months. At that time, younger boys could attend one of the houses. Hawking attended two independent (i.e. fee-paying) schools, first Radlett School and from September 1952, St Albans School after passing the eleven-plus a year early. The family placed a high value on education. Hawking's father wanted his son to attend the well-regarded Westminster School, but the 13-year-old Hawking was ill on the day of the scholarship examination.

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Stephen William Hawking ……continued from page 1

His family could not afford the school fees without the financial aid of a scholarship, so Hawking remained at St Albans. A positive consequence was that Hawking remained close to a group of friends with whom he enjoyed board games, the manufacture of fireworks, model aeroplanes and boats, and long discussions about Christianity and extrasensory perception. From 1958 on, with the help of the mathematics teacher Dikran Tahta, they built a computer from clock parts, an old telephone switchboard and other recycled components. Although known at school as "Einstein", Hawking was not initially successful academically. With time, he began to show considerable aptitude for scientific subjects and, inspired by Tahta, decided to read mathematics at university.

Hawking's father advised him to study medicine, concerned that there were few jobs for mathematics graduates. He also wanted his son to attend University College, Oxford, his own alma mater. As it was not possible to read mathematics there at the time, Hawking decided to study physics and chemistry. Despite his headmaster's advice to wait until the next year, Hawking was awarded a scholarship after taking the examinations in March 1959.

Hawking began his university education at University College, Oxford, in October 1959 at the age of 17. For the first 18 months, he was bored and lonely – he found the academic work "ridiculously easy". His physics tutor, Robert Berman, later said, "It was only necessary for him to know that something could be done, and he could do it without looking to see how other people did it."

Graduate years

Hawking's first year as a doctoral student was difficult. He was initially disappointed to find that he had been assigned Dennis William Sciama, one of the founders of modern cosmology, as a supervisor rather than noted Yorkshire astronomer Fred Hoyle, and he found his training in mathematics inadequate for work in general relativity and cosmology. After being diagnosed with motor neurone disease, Hawking fell into a depression – though his doctors advised that he continue with his studies, he felt there was little point. His disease progressed more slowly than doctors had predicted. Although Hawking had difficulty walking unsupported, and his speech was almost unintelligible, an initial diagnosis that he had only two years to live proved unfounded. With Sciama's encouragement, he returned to his work. Hawking started developing a reputation for brilliance and brashness when he publicly challenged the work of Fred Hoyle and his student Jayant Narlikar at a lecture in June 1964. When Hawking began his graduate studies, there was much debate in the physics community about the prevailing theories of the creation of the universe: the Big bang and Steady state theories. Inspired by Roger Penrose's theorem of a space-time singularity in the centre of black holes, Hawking applied the same thinking to the entire universe; and, during 1965, he wrote his thesis on this topic. Hawking's thesis was approved in 1966. There were other positive developments: Hawking received a research fellowship at Gonville and Caius college at Cambridge; he obtained his PhD degree in applied mathematics and theoretical physics, specializing in general relativity and cosmology, in March 1966; and his essay "Singularities and the Geometry of Space-Time" shared top honours with one by Penrose to win that year's prestigious Adamas Prize.

Disability outreach

Starting in the 1990s, Hawking accepted the mantle of role model for disabled people, lecturing and participating in fundraising activities. At the turn of the century, he and eleven other luminaries signed the *Charter for the Third Millennium on Disability*, which called on governments to prevent disability and protect the rights of the disabled. In 1999, Hawking was awarded the Julius Edgar Lilienfeld Prize of the American Physical Society. In August 2012, Hawking narrated the "Enlightenment" segment of the 2012 Summer Paralympics opening ceremony in London.

In 2013, the biographical documentary film Hawking, in which Hawking himself is featured, was released . In September 2013, he expressed support for the legalization of assisted suicide for the terminally ill. In August 2014, Hawking accepted the Ice Bucket challenge to promote ALS/MND awareness and raise contributions for research. As he had pneumonia in 2013, he was advised not to have ice poured over him, but his children volunteered to accept the challenge on his behalf.

In late 2006, Hawking revealed in a BBC interview that one of his greatest unfulfilled desires was to travel to space; on hearing this, Richard Branson offered a free flight into space with Virgin Galactic, which Hawking Immediately accepted. Besides personal ambition, he was motivated by the desire to increase public interest in spaceflight and to show the potential of people with disabilities. On 26 April 2007, Hawking flew aboard a specially-modified specially- modified Boeing 727–200 jet operated by Zero-Gcorp off the coast of Florida to experience weightlessness. Fears the manoeuvres would cause him undue discomfort proved groundless, and the flight was extended to eight parabolic arcs It was described . *Continued to page 6*

Feature article:

1. Topic: Advancements in Solar Physics and Space Weather Studies through Radio Imaging *(By G. Murtas, UK)*

The complex interplanetary environment surrounding the Solar System, confined by the local neighbourhood interstellar wind and permeated by the solar wind – namely the heliosphere – is drastically affected by high energy events of extragalactic, galactic and solar origin. The magnetic and radiative activity of our star itself has an enormous impact on planetary magnetospheres and ionospheres, ranging from subtle climate dependencies to severe radiation phenomena affecting operations and safety of our technologies on Earth (Koskinen et al. 2017). A wide variety of eruptive phenomena such as flares, coronal mass ejections (CMEs), solar particle events and radio bursts severely shape the interplanetary environment and strongly interact with Earth's magnetic field, turning into hazards for space missions and ground facilities. Both short-term and long-term forecasts are highly required for any space operation, from tasks based on human extra-vehicular activities (EVA) to operations carried out by radiation-sensitive detectors. For this reason, Sun real-time observations can provide useful warnings of solar activity, as large outburst events are usually associated with a strong emission of electromagnetic radiation (visible light, radio waves, soft X-rays). Through an extended set of indexes time series, based on prominent observed features, insights can be extrapolated about the long-term global behaviour of the Sun as a star and about the short-term localized behaviour of the Sun that would have geo-effective consequences.

One of the crucial aspects in the advancement of our understanding of space weather events is a detailend description of the high dynamic chromospheric layer, where the approximation of local thermodynamic equilibrium (LTE) becomes inadequate. The leading causes of space weather phenomena are generated deep in the convective zone, where the variable plasma flow plays a major role in the characterization of the structure and dynamics of the atmospheric layers above it. The plasma motion leads to a wide range of events – such as magnetic active regions and sunspots – happening at the solar surface over different spatial and time scales.

.. Due to the extreme variations of plasma conditions from the convective zone to the tenuous extended corona, several numerical approaches must be applied to investigate the different regimes. Sophisticated computational models are currently applied in order to study individual phases of the eruptions, but a complete model is still missing. Improvements are mostly required in the development of a thermodynamic MHD approach and parametric studies with simple models to examine the basic physics of eruptive phenomena (like torus instability and flare reconnection). A successful method which is currently employed to investigate the chromosphere is given by spectro-polarimetric observations on multiwavelengths, supported by the development of non-LTE spectro-polarimetric inversion codes (Socas-Navarro et al. 2000). Several instruments are working on this side: among them, a remarkable contribution is given by the DKIST, the CRISP instrument at the Swedish Solar Telescope (Scharmer et al. 2008), and the Chromosphere and Prominence Magnetometer, ChroMag (de Wijn et al. 2012).

Such observations over extended regions, combined with magnetic field measurements, are carried out with the main purpose of evaluate CMEs magnetic field at the moment in which they leave the Sun. The result would then solve the problem of knowing the magnetic field strength and direction of Earth-impacting CMEs.

Mapping the brightness temperature of the free continuum radio emission in the centimetre and millimetre range is another effective tool to characterize the vertical structure of the solar chromosphere (Gopalswamy, 2016). All the various plasma processes occurring in the solar atmosphere set up a complex and not fully understood radio emission picture needing spatially-resolved and time-resolved scientific data in order to fully explore their nature, complementing the wealth of existing information in the optical/UV/IR domain. One of the greatest challenges for radio imaging is given by a low spatial resolution; this constraint may be loosened thanks to the use of powerful aperture synthesis instruments. In the past few years, a new generation of observational facilities provided a major reinforcement in radio observations of the solar atmosphere.

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The Future …continued from page 4

Two of the most relevant ones are the Nobeyama Radioheliograph (NoRH; Nakajima et al. 1994), which produces full-disk routine observations of the Sun at 17 and 34 GHz, and the Siberian Solar Radio Telescope (SSRT; Grechnev et al. 2003), upgraded in 2017 with the Siberian Radioheliograph and designed to perform two dimensional mapping at 5.7 GHz. Their observations were used in the calculus of the mean solar radius variation in a wide range of frequencies (Selhorst, Silva and Costa, 2004; Krissinel, 2005) and for studies of quiet solar features (Grechnev et al. 2004) and bright sources in active regions. Recently, both instruments were used in the framework of multi-instrument investigations of solar eruptive events (Grechnev et al. 2018; Zhang, Li and Huang, 2018). Microwave imaging observations at 17 GHz from the NoRH were used for long term solar activity studies (Gopalswamy et al. 2018).

Multi-instrument investigations are also carried out with the Nançay Radio Heliograph, which regularly produces full maps of the solar corona in the frequency interval 150-450 MHz. Several works were published related to the investigation of type III radio bursts and the conditions under which they occur (Saint-Hilaire, Vilmer and Kerdraon, 2012; Alissandrakis et al. 2015).

For chromospheric studies, smart single-dish radio mapping of the solar disk is often more suitable than interferometric observations, especially at high-frequencies. Synthesis images through interferometric networks cannot be easily obtained for frequencies > 10-20 GHz on relatively large sources, with the exception of dedicated short-baseline facilities (previously mentioned) requiring non-trivial calibration and data analysis processes. Investigations of the solar disk through fast-scan single-dish mapping (White et al., 2017) were attempted by the Atacama Large Millimeter submillimeter Array (ALMA). ALMA allows solar observations in the frequency band 30-900 GHz, in which it is possible to directly probe the electron temperature of the solar atmosphere.

Such method was applied in order to provide an absolute temperature scale for the solar disk, which could not be directly obtained by the interferometer since the Sun is larger than the field of view of individual 12-m diameter ALMA dishes (thence the background level of solar emission couldn't be extrapolated). Recently, early images of the solar atmosphere in K-band (18-26 GHz) were produced with the Medicina 32-m Radio Telescope and Sardinia Radio Telescope, as a first test of solar observations using the Italian radio telescopes operating in single-dish mode Our pioneering and explorative observations could represent a first breadboard for the high-frequency radio monitoring … and radio monitoring and Target-of-Opportunity observations of the solar chromosphere using single-dish Italian antennas. In perspective, a comprehensive solar radio monitoring service inclusive of multi-frequency spectropolarimetric imaging could be provided by coupling the complementary potentialities of the Italian radio telescopes.

This Italian radio network facility will close different gaps that presently exist in the worldwide observing scenario, and will empower the present capabilities by introducing state-of-the-art techniques. In perspective, this application is suitable for detailed measurement of the chromospheric brightness temperature of the quiet Sun, sunspot umbrae and active regions, contributing to space weather monitoring networks and forecast.

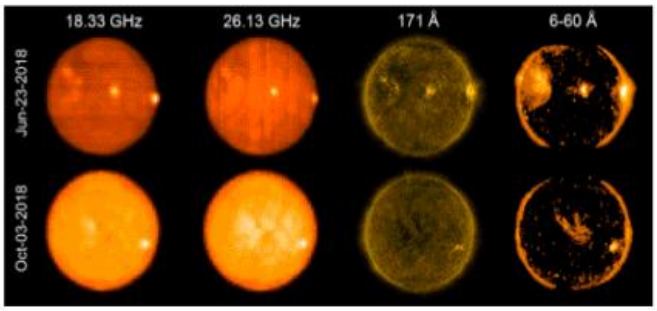


Fig. 1 - Set of preliminary solar disk maps collected at different frequencies with the 32-m Medicina Radio Telescope on June 23rd and October 3rd 2018, in comparison with EUV/Xray images (Credit: NOAA/NASA/SXI). Active regions and disk structures are clearly detected also in the radio images allowing multiwavelength spectral analysis. Credit: Pellizzoni, Righini, Murtas et al. 2019 (in prep.)

… *Stephen William Hawking continued from page 6*

event horizons must necessarily be axisymmetric; and that in the evolution and interaction of black holes, the total surface area of the event horizons must increase. In collaboration with G. Ellis, Hawking is the author of an impressive and original treatise on "Space-time in the Large".

The citation continues, "Other important work by Hawking relates to the interpretation of cosmological observations and to the design of gravitational wave detectors. Hawking received the 2015 BBBA Foundation Frontiers of Knowledge Award in Basic Sciences shared with Viatcheslav Mukhanov for discovering that the galaxies were formed from quantum fluctuations in the early Universe. At the 2016 Pride of Britain Awards, Hawking received the lifetime achievement award "for his contribution to science and British culture ". After receiving the award from Prime Minister Theresa may, Hawking humorously requested that she not seek his help with Brexit. **(source: https;//en.wikipedia.org)**

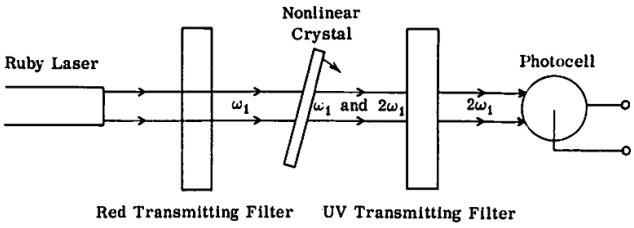
Feature article:

2. Crystal growth

Latest and Important developments of Non Linear Optical (NLO) materials

(by T.Gurumurthi, ASTU)

Optical communication and optical computing are the most appealing applications of the nonlinear phenomenon. With the growing use of fibre optics and optical communications technologies, photorefractive NLO materials have become prime candidates for all optical data processing applications. The below mentioned diagram is the NLO-Second harmonic generation (SHG) production using Nonlinear crystal.



The photorefractive effect where the refractive index change when the crystal is subjected to intense laser radiation. Due to the inhomogeneous change in the refractive index, defocusing and scattering of the light is observed. The photo refractive NLO materials are expected to be used for high density optical data storage, associative image processing techniques including dynamic holography and image amplification, spatial light modulation, programmable interconnections in integrated optics and simulation of neural works and associative memories with parallel signal processing. Inorganic NLO crystals such as $KT:OPO_4$ (KTP) and $RbTiOPO_4$ and their derivatives are useful for optical storage. Some of the photorefractive NLO semiconductors InP, GaP, GaAs, CdTe and CdS are commercially used as infrared lasers for optical communications due to their high carrier mobilities and sensitivity in the infrared region. *continued to page 10*

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.. as a successful test to see if he could withstand the g-forces involved in space flight. At the time, the date of Hawking's trip to space was projected to be as early as 2009, but commercial flights to space did not commence before his death.

Future of humanity

President Barack Obama at with Hawking in the White House before a ceremony presenting him … with the Presidential Medal of Freedom on 12 August 2009. In 2006, Hawking posed an open question on the Internet: "In a world that is in chaos politically, socially and environmentally, how can the human race sustain another 100 years?", later clarifying: "I don't know the answer. That is why I asked the question, to get people to think about it, and to be aware of the dangers we now face." Hawking expressed concern that life on Earth is at risk from a sudden nuclear war, a genetically engineered virus, global warming, or other dangers humans have not yet thought of. Hawking has stated: “I regard it as almost inevitable that either a nuclear confrontation or environmental catastrophe will cripple the Earth at some point in the next 1,000 years”, and has considered an "asteroid ollision" to be the biggest threat to the planet. Hawking taking a zero-gravity flight in a reduced –gravity aircraft, 2007.

Such a planet-wide disaster need not result in human extinction if the human race were to be able to colonise additional planets before the disaster. Hawking viewed spaceflight and the colonisation of space as necessary for the future of humanity. Hawking stated that, given the vastness of the universe, aliens likely exist, but that contact with them should be avoided. He warned that aliens might pillage Earth for resources. In 2010 he said, "If aliens visit us, the outcome would be much as when Columbus landed in America, which didn't turn out well for the Native Americans.“Hawking warned that superintelligent artificial intelligence could be pivotal in steering humanity's fate, stating that "the potential benefits are huge... Success in creating AI would be the biggest event in human history. It might also be the last, unless we learn how to avoid the risks." However, he argued that we should be more frightened of capitalism exacerbating economic inequality than robots.

Award and honors

Hawking received numerous awards and honors. Already early in the list, in 1974 he was elected a Fellow of the Royal Society). At that time, his nomination read: Hawking has made major contributions to the field of general relativity. These derive from a deep understanding of what is relevant to physics and astronomy, and especially from a mastery of wholly new mathematical techniques. Following the pioneering work of Penrose he established, partly alone and partly in collaboration with Penrose, a series of successively stronger theorems establishing the fundamental result that all realistic cosmological models must possess singularities. Using similar techniques, Hawking has proved the basic theorems on the laws governing black holes: that stationary solutions of Einstein's equations with smooth… *Continued to page 5*

EPS Guest: Professor Dereje Seifu

In this part, we present an interview made with Dr. Dereje Seifu, who is currently working as a tenured full professor of Physics at the department of Physics and Engineering Physics, Morgan State University, Baltimore, Maryland, USA. He is also serving as a vice president of Ethiopian physics Society North America (EPSNA). Here is the interview EPS had with him.

EPS: Would you start by briefly telling us your initial history?

Prof. Dereje: Ethiopia in 1960 was shocked by the first and major coup attempt led by a General in the Emperor's Elite Body guard force and his brother. This year marked the difference between the older generation Ethiopians who viewed challenging the monarchy for the sake of changes will cause an existential threat to the country since they lived through the Italian invasion and witnessed the gravity of losing one's own country. On the other hand, the younger generation who were very young or not yet born during the Italian invasion, to realize the grief of losing one's own country wanted an overhaul change, a revolution, by any means necessary, unfortunately the codetta of 1960 failed.

I was born during that time and it took another 14 years for another coup which was ignited by public unrest led by students' activists unfortunately the coup was hijacked by a committee of military officers (also known as Derg) formed to overlook the change and it stayed in power for 17 years. Students' activism continued immediately post-coup until it was squashed by the Derg. The students' demands were land reform and democratically elected civilian government. The land reform demand was satisfied by Derg but the second demand was in conflict with Derg's plan. Derg rather transformed itself and established a proletarian party based on scientific and dialectical materialism ideology. That time was the best of times and also the worst of times. It was the best of times since it exposed many students to a new ideology and helped students entertain selfless life standing up for the oppressed masses who are burdened with paying for all public services … and infrastructure including public education financed from the taxes they pay. During that time, it was popular amongst students to read books on historical and scientific and dialectic materialism to understand pamphlets published by opposition political parties. Reading books on the new philosophical ideology further increased my interest in Physics that was conceived during the summer break of 6th grade in 1972. I believed to answer bigger questions such as who are we, what is our origin and are we alone in this vast universe can only be answered by physics.

I decided to become a physicist after I read the book *Steps to the Stars* during the summer of 1972. I was awarded the book when I graduated from elementary school at Hara Meda Model School, in Debre Zeit, locally known as "Bishoftu". After my first year of middle school, my family and I moved to the capital city, Addis Ababa. One year later, the revolution of 1974 occurred. Besides numerous other incidents, several and longer periods of public school closures occurred due to students' protests. The school disruption and political unrest continued throughout my high school years. During my junior year, it became so dangerous to be a student that I had to leave day school and join an evening school for adults while working during the daytime. This helped me survive the chaotic times of the revolution when all students were considered anti-government forces.

I worked at an electronics company owned by a good friend of my uncle for two years; there, I was an assistant to the electronics technician and organized magazines. Whenever work was slow, I worked hard to hone my math skills, and I was able to pass the National School Leaving Exam.

EPS: Where did you pursue your university education?

Prof. Dereje: My scores on the National School Leaving Exam was good enough for me to gain admission into a degree program to Addis Ababa University (AAU). At AAU, I was one of the 250 freshmen physics majors and one of the 12 who willingly majored in physics. That year, three of the faculty members, including the department chair, were taken to the main prison for involvement in an opposition party. Two of them were released after seven years, and one was released after five years; he became one of my classmates when I began my Master's studies. Out of those 250 freshmen physics majors,

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Prof. Dereje Seifu…continued from page 7

…only 40 of us graduated, and out of the 40, 10 of us graduated with distinction. I was second in my class and given the chance to stay on as a lecturer at AAU. A year later, I began pursuing my Master's degree. I graduated from the master's program in November 1985. During that time, few months before completing my Master's program the whole University community was called for 3 months of campaign to build huts for new settlers. Physics students and faculty were assigned at Ubela, Gambela.

EPS: Tell us about your visits abroad

Prof. Dereje: After one year in the graduate program at AAU, I was offered an assistantship at the University of Miami, Florida, USA, but I was not allowed to leave the program at AAU. Instead, I was told to complete my Master's degree and to serve two years before going abroad for my Ph.D. In 1986, I enrolled in the spring school in condensed Matter physics at the International Center for Theoretical Physics (ICTP) in Trieste, Italy.

I applied to doctoral programs at nearly a dozen schools in Canada and the US and was offered a full scholarship to five of them. I chose the University of Cincinnati in Ohio USA. The schools to which I applied were mostly those with no application fee; this, in addition to my own lack of information, is one reason I did not apply to "top 10" schools.

During my first year in Cincinnati, I studied very hard and was one of the few who passed the Ph.D. qualifying exam in the first round. In terms of research, I joined a laboratory that specialized in Mössbauer spectroscopy, but after one year I decided to change to computational condensed matter physics. I made this decision so that, if I returned to AAU, I could pursue my research at ICTP in Trieste and AAU however, had I remained focused on experimental research, it would have been harder to pursue significant research at AAU. I completed a second Masters and my Ph.D . In seven years, March 1994, mostly working independently on my research. My Ph.D. research focused on the computation of the electronic structure of alloys, specifically ordered and disordered CUAU alloys, using the korring- kohn- Rostoker coherent potential approximation method.

EPS: Would you tell us about your employment and research experience

Prof. Dereje: The 1990s were a tough time to find a job or postdoctoral position in the US, even for experimentalists, let alone for theorists, because of the recession, the halting of the super-conductor and super-collider projects, and other factors such as the shift in the world order. I can count on only one hand the number of physics graduates from my graduate program who landed an academic job in the US during the seven years I was attending school.

…Since I wanted to pursue an academic career, I had a backup plan for returning to my old position, at AAU. Before leaving for the US, I had been a lecturer at AAU for five years, during which I had a wonderful time of studying and teaching physics. Morgan State University (MSU) in Baltimore, Maryland, USA came into the picture when I was visiting my sister, who was attending a graduate program there. A few weeks after my dissertation defense, while waiting for my transcript and Ph.D. degree to be processed, I had a chance encounter with the chair of MSU's physics department, who asked me if I was interested in some kind of academic position at MSU. This changed my destiny. At MSU, I started a research project on mechanical alloys and characterizing them using Mössbauer spectroscopy; this became my informal postdoctoral position in experimental physics.

Milling alloys and irradiating them with gamma rays to measure their Mössbauer spectra proved to be a lot of fun, and with that, I was converted to an experimental physicist. I used my computational skills to code the Mössbauer spectra analysis software from a cumbersome FORTRAN format to MATLAB. In 1994, this was a big deal, as it eased my efforts to analyze experimental data by about a factor of 10, saving time from data analysis for the interpretation of data.

EPS: Your academic promotion?

Prof. Dereje: I joined MUS first as a part-time lecturer and research associate in 1994, immediately after completing my Ph.D. from the University of Cincinnati in Cincinnati, Ohio. Independence in pursuing research I developed while in graduate school carried me even further after I joined MSU. In 1996, I traveled to Saint Louis, Missouri to present my findings at the American Physical Society (APS) conference (" Seifu, D, et al, Mossbauer study of SmFe, APS March meeting, St louis, Mo,March 1996"). The conference was so different for me that year, even though I was not new to APS.

I had been to APS in 1993 and 1994, while I was a graduate student, to present my Ph.D. research findings; however, in 1996, I was surrounded by many interested attendees. This reminded me of a saying by a professor at AAU: everyone believes an experimentalist's results; the only one who may have doubt in the results is the experimentalist himself, but this is not so for a theorist.

I went on to present my research at several national and international conferences, including ones held in England, Germany and India. My research in mechanical alloying led me to an area

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Prof. Dereje Seifu…. Continued from page 8

… that became very attractive in the mid-1990s, since milling for longer periods produced nano-particles with properties different from their bulk counterparts. This new area of research led me to join the nanotechnology branch of NASA, near Palo Alto, California (NASA Ames, at Moffet Field) during the summer of 2004 as a faculty research fellow.
During this time, I had already been promoted through several academic ranks at MSU, moving from a part-time lecturer to a full-time lecturer in 1995, to a tenure-track assistant professor in 1998, and finally to a tenured associate professor in 2003, based on my research, which had produced several publications and few grants. However, I wanted to expand my research horizons and to work more deeply in the areas of nanoscience and nanotechnology. This area of science and technology was predicted by the well know physicist Richard Feynman in 1960 in his American Physical Society (APS) talk "There's Plenty of Room at the Bottom" at an annual meeting of the at Caltech, December 1959.

I told the director at NASA Ames that I planned to visit the center every summer to pursue my research for few more years. He suggested that I work with his collaborators at the Materials Directorate of the US Army Research Laboratory (ARL) all year round, since ARL's proximity to my institute allows it. Beginning in 2005, I was a guest researcher there, where I remained until 2012, the year I received a collaborative research and education agreement (CREA) award from ARL, which is still active. The research I began at NASA Ames focuses on integrating the carbon nanotubes (CNTs) synthesized at NASA Ames with magnetic nanoparticles I prepare using mechanical alloying. I pursued this research at ARL, bridging my alloying lab to the nanoscience and nanotechnology lab at ARL. In 2009, I received a summer research fellowship at the National Synchrotron Light Source at Brookhaven National Lab, in Upton, NY, for three summers to learn how to use synchrotron light sources on the nano-materials I synthesize between my laboratory at MSU and at ARL. These activities, and the several colleagues with whom I interacted, inspired me to win the Major Research Instrumentation award from the National Science Foundation twice and an ARL CREA to build a state-of-the-art nanoscience and nanotechnology laboratory, and to sustain a research group (SRG). I have since presented my research at the APS, Michigan Technological University, Hofstra University, Howard University, and at several national and international conferences held in England (International Conference on the Applications of the Mössbauer Effect, Oxford, UK, September 2001), Germany (Conference on Magnetism, Seeheim, Germany, September 2001 and 2007) , Italy (International Conference on Magnetism, Rome, Italy, … August 2003), India (International Conference of Mossbauer Effect, Kanpur, India, 2007), Japan *(IEEE-NANO, 2016 IEEE 16th International Conference Sendai, Japan,*. IEEE, 2016), Finland (NANOENERGY 4th International Conference on Nanotechnology, Nanomaterials & Thin Films for Energy Applications, 2017), Ireland *(IEEE-NANO, 2018 IEEE 18th International Conference Cork, Ireland,* IEEE, 2018), and many major cities in the USA. In 2013, I was promoted by MSU to a full tenured professor position in physics.

In the last 24 years, I have served in several diffferent capacities ranging from a par – tim lecturer to an assistant, associate and finally full professor, I was also interim chair of the department for a total of four years and served as the graduate coordinator for 15 years.

At present, my research has two chief objectives. The first is to increase the magnetoresistance ratio of atomically engineered tunneling magnetoresistance. The second is to enhance the magnetic properties of carbon nanotubes and graphene via proximity-induced ferromagnetism using magnetic nanoparticles to develop magnetic semiconductors. During the summer of 2018 I was a faculty fellow at ARL's vehicle Technology Directorate. My research is focused on studying the magnetic properties of embedded nano-sensors. In the past, together with my group, I discovered that super-para-magnetism in magnetic nanowires can be suppressed by encapsulating them inside CNTs, Seifu et al JMMM 2008. Recently, we discovered proximity-induced ferromagnetism in graphene, Seifu et al APL 2018.

Beginning in 2018, and for the next two years, I am a member of a committee reviewing the physics portion of the Graduate Record Exam (GRE). I have been a contributor and editor of GRE test questions for the past 15 years. This year I am also elected to serve as the Vice president of the EPSNA. One of my tasks in this capacity is overseeing the EPSNA's 10-year plan.

EPS: Please tell us about your experience in Addis Ababa University

Prof. Dereje: I was a lecturer at Addis Ababa University (AAU) from 1982 to 1987 for five years, during which I had a wonderful time of studying and teaching physics. The greatest resources AAU have is the eager and hardworking students. During my 24 years of academic career at MSU I tried to join AAU as a Fulbright fellow first in 2005 and then again in 2015. I succeeded in getting fellowship from the US state department on phase one however, for reasons that are not clear to me it failed to go through the second phase. Surprisingly at both times there were political unrests in the country.

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Crystal growth …. Continued from page 6

$LiNbO_3$, $BaTiO_3$, $Ba_2NaNb_5O_{15}$, $KnbO_3$, BSO, KTN, $Ba_2SrNb_5O_{13}$ ..,etc., are the well known photorefractive materials due to their electro- optic and NLO properties even nowadays. These materials are very much useful in the field of real- time holography. Optical solitons, optical switching and memory by NLO effects which depend on light intensity are expected to result in the realization of pivotal optical devices in optical fibre communication (OFC) and optical computing which make the maximum use of light characteristics. Nonlinear optical materials are used to generate new laser sources of frequencies that cannot be obtained directly from available lasers. Among the nonlinear optical processes that have been studied, one of the most visually dramatic is frequency doubling which is particularly important in device applications. Recently in many optical frequency conversion (OFC), UP- and DOWN- converters are used to generate coherent light at wavelengths where no adequate lasers are available, and as optical mixers in optical communication system.

Latest optical parametric amplifiers (OPAs) are used for the detection of weak light at wavelength for which sensitive detectors are not available. Parametric devices use electro-optic effect, magneto-optic effect and acoustic-optic effect. Parametric amplification which is used to produce coherent radiation at frequencies in the ultraviolet region. Optical parametric oscillators (OPOs) are used for the generation of coherent light and mode- locked pulse trains over a continuous range of frequencies, usually in frequency bands where there is a paucity of tuneable laser sources. Parametric oscillators are widely used in photochemistry, high resolution spectroscopy, and the remote detection and the identification of atmospheric pollutants by optical radar. Zinc germanium phosphide ($ZnGeP_2$) is currently the material of choice for 2 µm-pumped OPO's operating between 2 and 8 µm. It has the highest NLO coefficient (75 pm/V) and the highest thermal conductivity (0.35 W/cmK) of any crystal, that is transparent and phase matchable at 2 µm. The parametric gain can be used to make a laser by placing the fiber inside a Fabry-Perot cavity. Such a parametric laser, known as Four-photon fiber laser, emits1.15 µm pulses of 65 ps duration. Green laser pointers are often made using KTP. Also KTP crystal is used for parametric devices with tunable outputs from red to the mid-infrared.

For the last decade the phase conjugator or phase conjugate mirrors (PCMs) are a special NLO mirror that reflects the wave back onto itself without altering its wavefronts. Optical phase conjugation is the process of changing the phase. i.e., changing a coverging beam into a diverging beam and vice versa. Such PCMs are used for image processing, neural network etc.. *Continued to page 11*

Prof. Dereje Seifu…. Continued from page 9

…Since the political situation in Ethiopia is now taking a better shape than it has ever been since the 1974 revolution that is during the last 44 years hopefully in the near future I will be able to return as a Fulbright fellow to AAU in Ethiopia for an extended period.

EPS: What do you think is the important contribution you have made at AAU?

Prof. Dereje: My contributions to AAU are the five years of service as a lecturer from 1982 to 1985, I am now a Ph.D. advisor of a former AAU student now at MSU, and I have served as a Ph.D. committee member to a former AAU graduate who graduated with a Ph.D. from MSU. My research group, Seifu Research Group (SRG), at MSU, consists of two doctoral students, three masters students, and two rising senior undergraduate research students. The important contributions are yet to come in the future for SRG will strive to collaborate with faculty members and their research students at AAU. I am also contributing to AAU and other physics departments in Ethiopian Universities by serving in the capacity of vice president of EPSNA. In that capacity, I am in charge of preparing documents on the 10-year strategic plan and achievements of EPSNA in the past 10 years.

EPS: Where are you living now?

Prof. Dereje: Currently I reside in Baltimore, Maryland, USA with my wife Bete whom I met at AAU, she was a 1st year student when I was a lecturer and working on my master's degree in 1985, and our two sons Amanuel and Mikael, 16 and 13 years old respectively.

EPS: What will be your advice to our students?

Prof. Dereje: I advise students to work hard on their education and focus on the present and only glance backward into the past briefly to see how far you came you shouldn't stare to long otherwise you will miss what is right in front of you. Don't worry too much about the future if you are doing well at the present time, your future will be brighter. As an old Latin proverb states, *a learned person always has wealth within himself.*

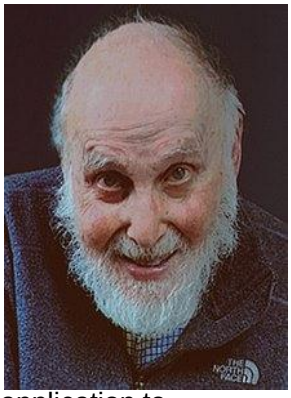
Students need to establish physics students' society (PSS) and be active and learn from their peers. PSS need to collaborate and arrange meetings with other student societies for the purpose of learning and exchanging ideas for higher learning isn't about finding oneself, rather it is about creating oneself.

PSS need to request the department and the university to restructure the physics curriculum at the undergraduate level by dividing it into at least three concentrations within physics. The first concentration should be for those who want to go into education, . *Continued to page 12*

NEWS:

1. The Nobel Prize winner in Physics 2018

In this column we present the three Nobel prize winner in 2018 in Physics.



1. Arthur Ashkin

Born: 2 September 1922, New York, NY, USA
Affiliation at the time of the award: Bell Laboratories, Holmdel, NJ, USA
Prize motivation: "for the optical tweezers and their application to biological systems."Prize share: ½

2. Gérard Mourou
Born: 22 June 1944, Albertville, France
Affiliation at the time of the award: École Polytechnique, Palaiseau, France, University of Michigan, Ann Arbor, MI, USA
Prize motivation: "for their method of generating high-intensity, ultra-short optical pulses.“ Prize share: 1/4

3. Donna Strickland
The Nobel Prize in Physics 2018
Born: 27 May 1959, Guelph, Canada
Affiliation at the time of the award: University of Waterloo, Waterloo, Canada
Prize motivation: "for their method of generating high-intensity, ultra-short optical pulses.“ Prize share: ¼

Crystal growth …. Continued from page 10

The SHG can provide the conversion IR laser light from Neodydium Yttrium Aluminium Garnet (Nd:YAG) laser (λ = 1064 nm) into green light (λ = 532 nm). Parametric processes can produce tunable laser radiation UV to the near IR. KDP (KH_2PO_4), DKDP (KD_2PO_4) and ADP ($NH_4H_2PO_4$) are widely used NLO crystal, as the second, third and fourth harmonic generators for Nd:YAG and Nd:YLF lasers. Both type I and type II phase-matchings can be employed for KDP and DKDP for frequency doubling (SHG) and tripling (THG) of Nd:YAG laser at 1064 nm. KDP is also used for frequency quadrupling (4HG, output at nm).

2. Superconductivity at near room temperature(260K)
Physical Review Letter 122, 027001 (2019)

Researchers at the George Washington University have taken a major step toward reaching one of the most sought-after goals in physics: **room temperature superconductivity**. Until now, superconducting materials were thought to have to cool to very low temperatures (minus 180 degrees Celsius or minus 292 degrees Fahrenheit), which limited their application. Since electrical resistance makes a system inefficient, eliminating some of this resistance by utilizing room temperature superconductors would allow for more efficient generation and use of electricity, enhanced energy transmission around the world and more powerful computing systems. They measured significant drops in resistivity when the sample cooled below 260 K (minus 13 C, or 8 F) at 180-200 gigapascals of pressure, presenting evidence of superconductivity at near-room temperature. The study was published today in the journal of Physical Review
(taken from: https://phys.org/news/2019)

Crystal growth …. Continued

of Nd:YAG laser. Proustite (Ag_3AsS_3) crystal finds a prime role in the available NLO materials for the study of phase material interactions between the infrared and the visible region. It is used in transmission of a wide ranging from 600 nm to 13 µm. Also it is used for sum-frequency generation (SFG) to mix CO_2 laser with Nd^{3+}: laser KDP, DKDP, ADP lithium iodate BBO, LBO, CLBOKTP, KTA, KB5,
tellurium dioxide, lead molybdate, silver thiogallate and silver selenogallate, zinc germanium phosphide, gallium selenide, BGO, BSO, LNB, LTA, lithium tetraborate, barium nitrate are widely used for electro-optical applications such
as Q-switches for Nd:YAG, Nd:YLF, Ti:sapphire and alexandrite lasers as well as for Pockel’s cells. The most commonly used electro-optical crystal is DKDP with deuterium more than 98%. Therefore, the search and design of high efficient nonlinear optical (NLO) crystals for visible and ultraviolet (UV) regions are extremely important for laser and material processing. The below mentioned materials are the latest Nonlinear optical materials for Second harmonic generations. 1. Glycine Trychloro acetate (GTCA) 2. L-Arginine hydrochlorofluoride monohydrate (LAHCIF).
END

Prof. Dereje Seifu…. Continued from page 10

… as all physics major did in the last 50 plus years at AAU. They would take 18 credits, or six courses, in education. The second concentration should be for those aspiring to become scientists. Those interested in condensed matter physics would need 18 credits (six courses) in chemistry. Those interested in high energy (elementary particle physics) would need 18 credits in math. Those focused on biophysics would need six courses in biology, while those interested, in geophysics would complete six geology courses, Medical physics students would need six courses in medicine, engineering physics would require six courses in engineering design and science, and so on. The third concentration should be for students aspiring to become entrepreneurs. psychology, and so on – remember that Nature does not know it! So let us put it all back together, not forgetting ultimately what it is for.

They would take six courses in economics and business management. Such structure of the physics curricula would make physics graduates more diverse, dynamic, and useful for society. For instance, physics entrepreneurs would form start-up companies that create jobs for many graduates and move the economy forward. They could also create internships program in their once startup companies for college-level as well as high school level students.

In my opinion, these three concentrations should be just the beginning. The university must be open to increasing the number of concentrations or, as they are usually referred to, minor areas, within the physics major. Students should be allowed to choose their minor and even be given the option of making their studies interdisciplinary. This would make the university more student-centered and produce graduates who can change the nation. For example, if a physics major is interested in becoming an author, he or she should be allowed to take 18 credits, or six courses, in literature. Student-centered educational policies will produce self-reliant and resilient students. They will not graduate and ask, "What's next?" Rather, they will create something extraordinary before graduating that will be useful not only for themselves in particular, but to the nation as a whole. Students who graduate from student-centered curricula will not graduate to go on and grab whatever job is available, even including day-laborer positions; instead, they will come up with extraordinary inventions that will excite and appeal to investors. Developing a mutually beneficial culture between the academic and business communities is essential.

Students should also know the only way to learn is by getting involved in the education process as the well-known American scientist, inventor, politician, philanthropist and business man Benjamin Franklin once said, *tell me and I'll forget; teach me and I'll remember; involve me and I'll learn*.

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71 years old Physics student at the AAU

(From the student corner)

On Thursday, 23rd day of October 1947 G.C. a child was born in the central part of Asmara from a middle class gold smith family whose ancestors came from Axum. As per the Orthodox Church decree, he was baptized after 40 days, that is on the 21st of Hidar. This day is the **"**St Merry's Day of Hidar Tsion**"**. For this rationale he was named after a geez word **"Zeratzion Woldelul"**, meaning the **"**seed of St. Merry**"**. Zeratzion grew up and went to school in Asmara. At the age of 19 he joined the Haileselassie I University (HIU), College of Agriculture at Alemaya and in 1973 graduated in the field of agricultural engineering. During the time he was doing his Agricultural Engineering education in Alemaya, on top of the basic engineering courses he endured taking pure agricultural subjects such as Botany, Zoology and Poultry.

One year before graduation, students from HIU were obliged to do their Ethiopian University Service (EUS) for one year. In the year 1971-72, Zeratzion was assigned to go to **"**Dejiazmach Woldegabriel Aba Seitan High School**"** – Assebe Teferi (now known as **"**Chiro**"**) to teach Physics as his EUS program. There he enjoyed teaching 10th –12th grade students. During his weekends, students enjoyed to go to the school and discuss more of their Physics problems in Amharic. This made the students to understand the subject better.

After graduation, Zeratzion worked for the Ministry of Agriculture as an extension supervisor for three years. In 1976 he joined the Institute of Agricultural Research (IAR) as a Research Officer. There, he accomplished remarkable projects in irrigation, machinery and alternative sources of energy for rural communities. He was then granted a scholarship by the UNFAO to join the Indian Institute of Technology, Delhi (IITD) along with his colleague Dr. Bentikassegn Workalemahu from the Addis Ababa University (AAU), Physics Department. There they both were awarded Post Graduate Diploma in Alternative Sources of Energy (1983).

It was not so easy for the young agricultural engineer to join the Thin Films Laboratory in IITD and to learn the basics of Applied Atomic Physics, Solid State Physics, Introduction to Relativity, Statistical Physics and Physics of Semiconductors. His research project work, however, was on the Development of Screen printed *pN* junction CdS Solar Cells on glass substrate. The final result of his project was published in the Journal of Applied

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71 years old …. *Continued from page 12*

… Physics[1,] India under the name of his advisor, Prof K.L. Chopra[2] and himself. Zeratzion did some work in **"**Printed Circuit Board and memory chips**"** along with members of the Thin Films Laboratory

Side by side to his research work it was a pleasure for him to do an additional work in laboratory equipment maintenance. After his completion of the course he was awarded an additional certificate on the maintenance of laboratory equipment.

Again it was not so easy, but a great pleasure for Zeratzion to attend and get a two hour-lecture on quantum mechanics, by a Nobel Prize Laureate Leo Esaki from Sony Co. from Japan. The lecture focused on the subject that electrons might be able to **"**tunnel**"** through a thin insulating barrier. As a result Esaki developed a diode with electrical junctions only 10 billionths of a meter thick. One of the most significant lectures he attended during his stay in IITD included the subject of **"**Economic Relevance of Atomic Physics**"** given by a senior Professor from California Institute of Technology.

After he completed his studies in India, the engineer flew directly to the University of Reading, U.K. where he achieved his Master's Degree in Alternative sources of Energy. There, he specialized in the application of **"**Solar Electricity for Pumping Water**"**. His work was awarded a **"**pending patent right**"**. The project was published in the Journal of Solar Energy Society, U.K. under the name of his advisor, Roger Bentley and himself[3].

Despite the dangers of the communist military derg regime, Zeratzion Woldelul chose to go back to Ethiopia and serve the needy Agricultural Research Institute vis-a-vis the Ethiopian rural community. After some time of service, in alternative sources of energy (biogas, biomass and wind energy4), unfortunately, the Institute preferred his service as a Senior Expert in Office and Laboratory Equipment Maintenance Engineer than to do research works in energy. In any case, the engineer did remarkable work in laboratory equipment maintenances as a licensed and a qualified engineer for over 25 years. He gave decent services for the Construction Design Share Company, Jimma University, Pasteur Institute, Contractors, Consultants and many other organizations. His innovative ideas on manufacturing laboratory equipment projects were awarded four times by the Ministry of Science and Technology,

…Enterprise Ethiopia of the Ministry of Industry and PCI-Ethiopia programs In 2012-13, at the age of 65, Zeratzion shifted his work into writing Physics books in Amharic. With the idea to fulfill his dreams on the affirmation of educating students using mother tongue or other local languages is the sole means that can improve quality of education. He wrote Physics books in Amharic for grade 7 and 8. The books were awarded 1st by Bahrdar University. The books also got high appreciation by the Amharic Department of the AAU.

From the above motivations he got, Zeratzion wrote second editions of the Physics books in Amharic for grade 7 and 8. He also wrote first editions of the following books:-1. Physics in Amharic for grade 9, 2. Atomic Physics and Technologies that benefitted from Modern Physics in Amharic (19 Chapters), and 3. General Physics in Amharic 850 pages.

Zeratzion now has over 50 physics books in his shelf. In 2017 he met Dr. Solomon Belay and w/t Etsegenet, both from the Ethiopian Space Science Technology Institute (ESSTI). These astronomers inspired Zeratzion in Astronomy and Astrophysics. He read books with a total of over 3000 pages and tried to translate the summary of the books in Amharic. Finally, he came up with a book on **"**Astronomy and Astrophysics**"** in Amharic (Zero draft). He became a member of the Ethiopian Space Science Society (ESSS) where he was awarded a certificate for regularly attending a conference in Astronomy. He was also awarded an original photograph of Charles F. Bolden, who in 1990 replaced the bleared mirror of Hubble Telescope in the outer space and was once the Chairman of NASA.

From the Astronomers and Astrophysicists impression he got, Zeratzion sat for an entrance examination to join the Astronomy and Astrophysics Section of the Physics Department of the AAU. He successfully passed the exam and joined the Department as a private candidate in the first semester of the 2018/2019 A.Y. In one of my discussions with Ato Zeratzion about his current Physics education, **"**Waw**"** he said, **"**What a pleasure is to talk about calculus after over 46 years, to read about Statistical mechanics after 35 years, to be a member of a class room with about 20 years old young students, to be a member of the Science Library in Arat Kilo Campus and read books not only to pass exams, but also to know things as they are**"**. He also said, **"**After all, individuals like Michael Faraday and Thomas A. Edison did not attend formal schools, but they read books and became great scientists**"**.

From his outlook it seems he is very much enjoying going to school at the age 71. **"**My going to school**"** said Zeratzion **"**could be a good example to many fellow individuals in that one's age does not matter to go to school!! *Continued to page 14*

1.Chopra K.L., Zeratzion W., T.V. Rao, (1983). Screen Printed CdS/CuS Films for Solar Cells, Journal of Applied Physics, Lett. Vol. IX, No. 2, April 1983, Delhi, India.

2. Later, Prof K.L. Chopra was the Director of IIT Khragpur

3. Bentley R., Zeratzion W., Kostas N., (1985). The Application of Photovoltaics using Concentrators for Pumping Water, Journal of Solar Energy Society, Vol. IV, No. 1, December 1985, U.K

4. The Conversion of Agricultural Residue into Charcoal, Ethiopian Journal of Agricultural Sciences 1987 (EJAS).

71 years old …. *Continued from page 1 2*

After all as long as one is alive he always learns in life. Life itself is a class room. There is nothing wrong going to a formal class room, sit and learn at any age**"**.Future vision of Zeratzion is not to get employed in any organization as physics personnel at the age of 73 (at the time he graduates) or to get a better income from any employing organization, but:-

(1)To study more of Physics, specialize in Astronomy and Astrophysics at M.Sc. degree level and complete his Amharic book.in "ስነፈለክ እና የስነፈለክ ፊዚክስ" (2) To collaborate with interested undergraduate Physics students and Dr. Remudin Reshad, who is very much interested in the installation of the 10 years old telescope sitting in one of the Physics Department offices without any function. He dreams of the telescope to be placed where interested students could enjoy observing at least our solar system and be fascinated with astronomy, (3) To write more books in Amharic preferably in Physics, Mathematics and books in technology, (4) To illustrate others that anybody can go to school at any age, and (5) To encourage others to write school text books in local languages such as Amharic, Oromofa and Tigrygna…

The END.

We wish Ato Zeratzion the best of luck in his education and his future program!!

Prof. Dereje Seifu…. Continued from page 12

One other advice I would like to give to students is always remember no one gets sudden rise, not even the Sun. It takes time to rise to the peak of success. You just have to keep your efforts going on and to be positive. As one of American well-known writer, humorist, entrepreneur, publisher, and lecturer Samuel Langhorne, better known by his pen name Mark Twain said, *twenty years from now you will be more disappointed by the things you didn't do than by the ones you did do. Explore! Dream! Discover!*

The last advice I will give to physics major students is to have respect to other disciplines and learn from the other majors through discussions and peer to peer learning. I would like to close by quoting the well known physicist and Nobel Laurette on this Nobel Prize acceptance speech said, *if our small minds, for some convenience, divide this universe, into parts - physics, biology, geology, astronomy,..*

Thank you !

Quotes from A. Einstein

"**Physics is an attempt conceptually to grasp reality as something that is considered to be independent of its being observed. In this sense one speaks of physical reality."**
Albert Einstein

Quotes from Eedward teller

-The science of today is the technology of tomorrow.
-The main purpose of science is simplicity and as we understand more things, everything is becoming simpler

Question

1. Since Magnets never stop working(unless they overheat), why don't scientists use them to create clean energy?

EPS North America Award for physics students in Ethiopia

EPS NA is Ethiopian Physical Society in North America. It is functioning in USA and Canada and makes significant contributions towards the objectives of Ethiopian Physical Society here at home.

EPS-NA recently announced the establishment of a yearly award for undergraduate and graduate students of physics in Ethiopian recognition of their academic and research achievements and in the spirit of supporting physics education and research in the country. The awards which began as of the year 2014 are:

- (ES-NA) Undergraduate Student of the year ward

- (E PS-NA) Graduate Student of the year award

EPS-NA has formally delegated EPS Ethiopia to conduct the screening of candidates in each category. The award is a onetime reward in terms of money and certificate for competitive students.

The EPS here in Ethiopia announces the call for competition for the award every year and selects candidates before annual EPS conference. For this purpose, EPS executive committee communicates with departments of physics in Ethiopian universities so that they can announce and encourage the students to apply for the award and send to the EPS all forms (application, nomination, academic and non-academic references), recommendations, copies of supporting documents of and nominee's personal statement (motivation). All these are used for selection and forming short list of candidates to be sent to EPS NA for final decision.

So far candidates from few universities have been participated in the competition. However, it seems that there is a lack of information in other universities such that the committee likes to ask the EPS members, especially instructors to share this information with students.

Remark: Visit the website of the society for further information.

Winners of the 2019 EPS-NA grant for physics students in Ethiopia

Name	Institute	Program
Mahbuba Ahmed	Dire Dawa University	B.Sc
Chalchisa Degu	Jimma University	B.Sc
Boka Fekadu	Adama Science and Technology University	MSc
Minale Shegaw	Adama Science and Technology University	MSc.
Haftu Berhe	Haromaya University	PhD.
Teshager Argaw	Haromaya University	PhD.

The Shobhana Gholap Award for Female Physics students is also conducted every year on annual EPS conference alongside with EPS NA Award. This is the fourth time it is being conducted. The selection from students of physics in Ethiopian universities in recognition of their academic and research achievements. The students must apply for the award and EPS handles the process of selection. It is announced every time before the annual EPS conference. We ask all universities to encourage their female students to take part in the competition.

The Shobhana Gholap Award Winner of the 2019
Kidist Gashaw Deresse
BSc. Student from Madda Walabu University

About the Ethiopian Physical Society

The Ethiopian Physical Society (EPS) was founded on October 10, 1998 by Ethiopian physics professionals to enhance physics education and research in the country. Some of the objectives of EPS are:

- To promote physics education and research in the country;
- To organize and coordinate various conferences on physics education for exchange of scientific information;
- To popularize physics in order to make students develop interest in physics;
- To promote active participation of Ethiopian physicists and the general public in the design and implementation of the physics curriculum;
- To provide assistance to members when they encounter professional problems; and
- To create a means for disseminating scientific information.

Physics professionals are encouraged to apply for membership.

Membership Type

1. **Regular Member**
   A person could be a regular member if he/she is at least a diploma graduate in physics or has completed two years of college education in physics, with at least three years of work experience in the field. He/she must also be currently working in the field or related area.
2. **Associate Member**
   A person who has been trained in physics but who has changed his/her profession.
3. **Student Member**
   A student who has at least two years of college education in physics.

Membership Fees:

1. **Registration Fees**
   Regular member: Birr 50
   Associate member : Birr 30
   Student member: Birr 5
2. **Annual contributions**
   Regular member: Birr 100
   Associate member: Birr 50
   Student member: Birr 10

Annual Conference Participation Fee Birr 200