

The efforts to publish online newsletter in physics by the Department of physics were started in 2015 and now has become a successful publication of the department with increased readers. The second issue of the third volume is now ready for its readers and followers on facebook. The faculty is fully dedicated to enrich the readers of KMVPHY-SPECTRUM and is thankful to its followers.

Visionary Physicist

I don’t have to know an answer. I don’t feel frightened by not knowing things, by being lost in a mysterious universe within any purpose, which is the way it really is, so far as I can tell. It doesn’t frighten me.

Richard Feynman

ROHINI GODBOLE: THE HIGH ENERGY PHYSICIST



Ask anyone to name an Indian scientist and you can probably bet that most names will be male. The good news is that there is an increasing number of women receiving an education in the sciences in India. Working in science has not been easy for women, with its long hours, societal biases, and the need to get married and have children in between. Prof. Rohini Godbole is an one such example among renowned Indian physicist. She is a professor at the Centre for High Energy Physics, Indian Institute of Science, Bangalore. She has worked extensively on different aspects of particle phenomenology over the past three decades, in particular on exploring different aspects of the Standard Model of Particle Physics (SM) and the physics beyond it (BSM). Her work on high energy photons could form the basis for the next generation of particle colliders, used to study the fabric and composition of the Universe.

She works on aspects of the Standard Model of particle physics, which describes the properties and behaviour of elementary particles of the Universe. She is an elected fellow of all the three academies of Science of India and also the Science Academy of the Developing World (TWAS). Apart from her work in academics, Prof. Godbole is also a much sought-after communicator of science, often delivering talks to young students, scholars and scientists on everything physics. She is also an avid supporter of women pursuing careers in science and technology, and along with Ram Ramaswamy, edited the book Lilavati’s Daughters, a collection of biographical essays on women scientists from India. She is today a part of the International Detector Advisory Group for the International Linear Collider (ILC) at CERN, which monitors the design and working of the ILC detector. She is also the Chairperson of the ‘Panel for Women in Science’ initiative of the Indian Academy of Sciences. With other particle physicists, she have worked to formulate another theory super symmetry — SUSY for short — and authored a graduate-level textbook on the subject. Part of her work is to propose efficient ways and means to search for hypothetical particles and suggest measurements to establish their crucial properties.

Science for Rohini began in standard seven , when her all-girls school in Pune started teaching physical sciences instead of home science. Thanks to the encouragement of her teachers at school, Rohini realised that “science was fun”. A series of scholarships ensured she went to the best schools in the country and abroad.

After completing her Ph. D in the U.S., she returned to India to pursue particle physics, and in 1996, she joined the prestigious Indian Institute of Science (IISc.) as professor, where she has been staying ever since. “The first time I came to IISc., I told myself I would be coming back here often,” the physicist says. However, she laments that while the campus has remained the same, the area around it has changed. She recalls that when she began her foray into particle physics, there was probably one other woman in the field. Now the count is more than 10. Even though the situation is improving for women, she says that they have certain disadvantages in the scientific community here. “Women have to be really lucky to be a good scientist, a mother, and look after the family.” She has written a book 'A Girls' Guide to a Life in Science' containing material which we hope will inspire young girls to take up a career in Science. Interestingly, this book along with the book on Supersymmetry were included in suggested reading for two separate courses, one in physics and one in Humanity, at Stanford University in one semester. Godbole believes that the first step in addressing gender issues and bringing about change would be to initiate informed discussion and dialogue, leading to concrete solutions. “One dimension is policy changes but the second dimension is an awakening of the community,” she said. This, she hopes, will eventually create more opportunities in future for young women to continue working in science.

Science News Section

Physicists zoom in on mysterious 'missing' antimatter

When the Universe arose some 13.7 billion years ago, the Big Bang generated matter and antimatter particles in mirroring pairs. Yet everything we can see in the Cosmos today is made of matter particles whose antimatter twins are nowhere to be found. Physicists at Europe's massive underground particle lab said they have taken a step closer to solving the mystery through unprecedented observation of an antimatter particle they forged in the lab—an atom of "antihydrogen". The team creates hydrogen mirror particles by taking antiprotons left over from the CERN's high-energy particle collisions and binding them with positrons (the twins of electrons). The resulting antihydrogen atoms are held in a magnetic trap to prevent them from coming into contact with matter and self-annihilating. The team then studies the atoms' reaction to laser light. Atoms from different types of matter absorb different frequencies of light, and under the prevailing theory, hydrogen and antihydrogen should absorb the same type. So far, it seems they do. But the team will hope for differences to emerge as the experiment is fine-tuned.

How physicists will remember Stephen Hawking

Stephen Hawking, a black hole whisperer who divined the secrets of the universe’s most inscrutable objects, left a legacy of cosmological puzzles sparked by his work, and inspired a generation of scientists who grew up reading his books. Upon Hawking’s death on March 14 at age 76, his most famous discovery — that black holes aren’t entirely black, but emit faint radiation — was still fueling debate. Hawking “really, really cared about the truth, and trying to find it,” says physicist Andrew Strominger of Harvard University, who collaborated with the famed scientist. Hawking “was deeply committed, his whole life, to this quest of understanding more about the physical universe around us.” After earning his Ph.D. in 1965 at the University of Cambridge, Hawking continued studying cosmology there for the rest of his life. Due to a degenerative illness, amyotrophic lateral sclerosis, or ALS, Hawking gradually lost control of his body, requiring a wheelchair and eventually a voice synthesizer to speak. Yet his desire to uncover nature’s secrets remained boundless.

DR. SWAPAN CHATTOPADHYAY: A PARTICLE ACCELERATOR PHYSICIST



Dr. Swapan Chattopadhyay is a particle Accelerator Physicist noted for his pioneering contributions of innovative concepts, techniques and developments in high energy particle colliders, coherent and incoherent light sources, ultrafast science in the femto- and atoo- second regimes, superconducting linear accelerators and various applications of interaction of particles and light beams. He is the associate director for accelerator operations, research and development and is responsible for implementing JLab policies and programs as they relate to the accelerator division. He is leading a multidisciplinary team of more than 350 in a multi faceted high tech environment involving the physics of particles and light beams, forefront electronics, superconductivity, surface science and computer process control applications.

He was born in kolkata in 1951 to a chemist, who worked in telecommunications department. He spent his childhood days in Darjeeling. He learned mountaineering from Sir Edmund Hillary and Tenzing Norgay during the inauguration of the Himalayan Mountaineering Institute in 1957. This started his lifelong fascination with science on the one hand and climbing mountains and trekking on the other, in additon to an addiction to tea. At one point in his formative years, he had seriously considered the profession of mountain climbing and much later in life, has been driven to explore the remote regions of western Tibet, the sources of rivers Indus and Brahmaputra, the sacred mountain Kailas and Lake Manasarovar. He completed his graduation in physics from St. Xavier’s College, Kolkata in 1970 and took his M.Sc. Degree from IIT, Kharagpur. Hoping to combine his passion for physics with the desire to explore naure, and upon direct invitation from Prof. Michael Moravscik as chair of the physics interview committee of the American Physical Society, he then joined in 1972 the physics department of the university of Oregon at Eugene in the pacific northwest region of USA, known for its rugged natural beauty. Joining Lawrence Berkeley, National Laboratory after his Doctorate gave new directions to his career. He was greatly influenced by the visit of Simon Van der Meer and Carlo Rubbia to the laboratory, speaking on the possibilities of stochastic phase space cooling of antiproton beams and the exciting possibilities with proton-antiproton collisions. Currently He holds the Presidential Chair of research, scholarships and artistry at Northern Illinois University. He was the inaugural Director of Cockcroft Institute (UK) having been appointed in April 2007. his research there included development of sources of ultra-cold relativistic free electron beams to advanced coherent electron diffraction techniques; production of novel coherent and ultra-short pulses of photons; novel high energy colliders, cavity search for dark matter and lab investigations of dark energy via atom interferometer techniques. He has directly contributed to the development of the super proton-antiproton synchrotron at CERN, the advanced light source at Berkeley, the asymmetric energy electron-positron collider PEP-II at Stanford, the continuous electron beam accelerator facility at Jefferson Laboratory and the free electron lasers at Jefferson and Daresbury laboratories. He is a fellow of american Physical society, Institute of Physics (UK) and Royal Society of Arts, Manufactures and Commerce (UK).

In short Dr. Chattopadhyay has numerous contributions in the field of particle and accelerators physics.

David Kaplan wins 2018 Gemant Award from the American Institute of Physics

WASHINGTON, D.C., April 23, 2018 -- The American Institute of Physics announced that particle physicist and movie producer David Kaplan has won the 2018 Andrew Gemant Award, an annual prize recognizing contributions to the cultural, artistic and humanistic dimension of physics. The award is made possible by a bequest of Andrew Gemant to the American Institute of Physics and includes a cash prize of \$5,000 and a grant of \$3,000 to further the public communication of physics at an institution of Kaplan's choice. Currently, Kaplan is a professor in the physics and astronomy department at Johns Hopkins University in Baltimore, Maryland. Kaplan is known in the world of particle physics for his work on the theoretical underpinnings of the Higgs boson, for his work on asymmetric dark matter and for experimental search strategies now being implemented at the Large Hadron Collider. The Gemant Award recognizes Kaplan's achievements as the producer of "Particle Fever," a documentary about the Large Hadron Collider's first discoveries. His work captures the fundamental human experience at CERN's Large Hadron Collider, where groundbreaking discoveries have helped reveal some of the most fundamental secrets of our physical universe. Since critically acclaimed release of "Particle Fever," Kaplan has stayed engaged in both research and science outreach. In addition to teaching, Kaplan has been producing short instructional videos about physics for the online science magazine Quanta and developing new film and TV ideas based on the lives of scientists.

This five letter word becomes shorter when you add two letters to it?

Answers to previous issue questions and puzzles Think Over it

- When turned upside down all three numbers still read the same.
- They both have roots

Science Crossword Puzzles

Across:1. Refraction 7. Transparent 10. Image 11. Surface 12. White 14. Incident 17. Lens 18. Mirror 19. Absorb 20. Black

Down: 2. Reflect 3. Opaque 4. Spectrum 5. Transmit 6. Translucent 8. Reflection 9. Ray 13. Diamond 15. Normal 16. Glass

INSPIRE Program sponsored by DST has been organized AT KMV



14 different schools across Punjab have sent as many as 205 students to participate in INSPIRE program organized by KMV. It is heartening to note that year after year brilliant students from across Punjab gather at one place breaking institutional barriers for intellectual interface and growth. This year the Deputy Commissioner/Deputy Magistrate Jalandhar, Mr. Varinder Kumar Sharma was the chief guest for the inaugural session. The first talk of the fifth INSPIRE Camp was delivered by Dr. S. Prabhu and he discussed the difference between various types of waves Mechanical waves, Electromagnetic waves, gravity waves sound waves, etc. Principal praised the efforts of Indian govt to organize such camps and said that these camps provide intense learning experience to the young minds.

Four Extension Lectures have been organized during the semester

Four extension lectures on various advanced topics have been organized by the PG department of Physics for the better development of the students and provide them the place to know about the technological advancements in the field of physics. The first lecture was delivered by Mr. Varun Aryan Chabbra from Nanotechnology department, CDAC Mohali on Feb 16, 2018 and he enriched the students with the applications of Nanoscience and technology in real world.



Dr. Arvind Dhillon from IISER Mohali has delivered an expertise talk on Philosophy of Sciences on Feb20, 2018, whereas Dr. Atul Khanna Deptt. Of Physics, G.N.D.U., Amritsar shared his incisive views on Science and Technology in sustainable Development on feb 28, 2018. Glass- An unsung Hero of the Scientific Revolution was the title of the lecture delivered by Dr. Ashutosh Goel, Assistant Professor, Department of Materials Science & Engineering, Rutgers, The State University of New Jersey, U.S.A on Mar 15, 2018.

K.M.V. celebrated “National Science Day”



Science faculty commemorated National Science Day under DBT Star College Scheme on the theme Science and Technology for Sustainable Development. The event began with the power point presentation by students on Innovative ideas for sustainable development. Dr. Atul Khanna, Prof., Deptt. Of Physics, G.N.D.U., Amritsar was the guest of honour of the day. He explained to students about the role of science in making our lives comfortable and easier. He emphasized that despite all these advances in science and technology there is imbalance, inequality and conflicts in the society that lead to the over consumptions of the resources thus leading to unsustainability. Dr. Updesh Kaur expressed gratitude towards the worthy resource person and the organizing team for the success of the event.

Social Extension Program “ Science to Humanity”



P.G. department of Physics organized a social extension program at Banarsi Dass School, Transport Nagar, Jalandhar. Students of B.Sc. II & III year (Non Medical & C.Sc.) have spread awareness about the day to day problems & their solutions to students in the form of Nukkad Natak on “ Science to Humanity” to lead a happy & smooth life. The aim of this program was to provide knowledge and help for better management of children and to promote better social, natural recreational intellectual and spiritual file among the rural families.

SCI-BRATION 2018 was organised under DBT Star Scheme

Sci-bration 2018, the celebration of Science and Innovation under DBT Star College Scheme sponsored by Department of Biotechnology (DBT) was organized by Science Faculty. It was an Inter-college competition based on the theme of Science and Technology for Sustainable Development. Various colleges participated in competitions like Choreography, Poster Presentation, Fancy Dress contest, Plant variety show and cooking without fuel. The chief guest for the occasion prof. Atima Sharma Dwivedi, Principal KMV addressed the gathering and said that all such events are meant for the students and the students are the heroes of such event. She encouraged the students to become good scientists, innovators and rise above orthodox and unexamined practices. The proceedings of the day took off with a mesmerizing classical dance performance.



KMV students visited Science city



Students of Kanya Maha Vidyalaya, Jalandhar visited Pushpa Gujral Science City, Kapurthala. About 380 science students accompanied with 17 teachers visited there to enhance their knowledge about the various innovative demonstrations of Science concepts. Students visited to various educational galleries consist of Earthquake Simulator, Flight simulator, Dome theatre, 3-D show & Climate change theatre etc. They watched models on aircraft & satellites, space shuttles in Space & Aviation Gallery. There was also Fun Science exhibits where around 100 assorted interactive exhibits designed, fabricated & clustered together on the basis of basic science themes. Students visited to Energy education & Awareness Park where there were various demonstrations uses of various forms of non- conventional energy sources such as Solar energy, wind energy, bio energy & nuclear energy and they also visited sports gallery where there were various applications of scientific principles in sports. It was a trip to the place where science, fun & learning are inseparable.

Star Achievers Day was celebrated on 31st march, 2018

KMV Star Science Achievers’ Day was celebrated on 31st March 2018, in which about 60 students of under graduate science classes like B.Sc. Non medical, B.sc. Medical, B.sc. Biotech, B.Sc. with Food Science and Microbiology were honored by giving away cash prizes to them. Meritorious students were given cash prize of 800/-, and those scoring above 75% were given cash prize Rs. 500/- .



M.Sc. Physics Girls are shining in university results

Students of M.Sc. Physics Sem I of Kanya Maha Vidyalaya got various university positions in G.N.D.U. Examinations. Ms. Amandeep and Ms. Harsimran got 3rd and 4th positions, 5th and 6th positions were grabbed by Ms. Gaganpreet Kaur and Ms. Anmol respectively at 6th position (425/600). Ms. Kezia stood on 7th and Ms. Vidhi on 8th position.

Students of P.G. Department of Physics of Kanya Maha Vidyalaya have always been excelling in academics scoring a number of university positions in university in each exam

KMVites accord warm farewell to their senior students

A Farewell Party “ SAYONARA 2018” was organized by post graduate students of Physics department.. The function started with welcome speech given by junior students & function continued with poetry & various fun games and dance items. After three rounds of modelling Miss. Kirti was selected for the title Miss Sayonara.

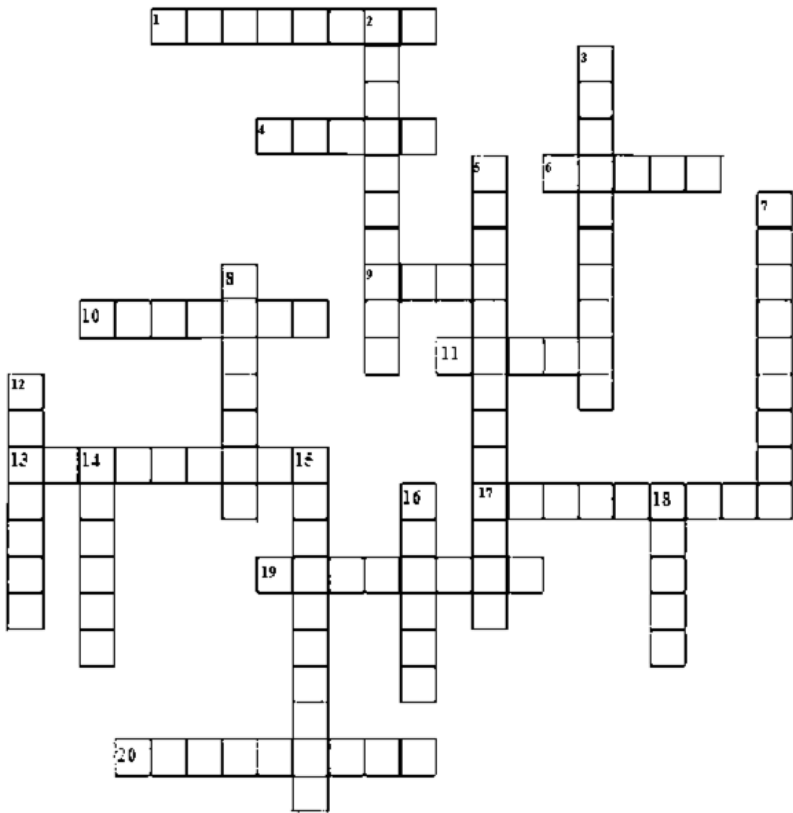
An event ‘The Sayonara Bash’ was organised to bid farewell to graduate Non Medical & Comp. Sc. Students. The function continued with various solo & group dance performances. Some fun games like Paper dance were also the part of the event. Ms. Pallavi was elected as Miss Sayonara.

Ms. Kirandeep was awarded with the title Miss Elegant, whereas Ms Ambika and Ms. Shaweta received the titles of Miss Attire and Miss Beautiful Smile, respectively. Outgoing students shared their wonderful & fun loving memories among gathering.



Fun Times with Physics

Science Crossword Puzzles



- ACROSS**
- 1. The name of our galaxy
 - 4. A very small star
 - 6. The planet closest to Earth
 - 9. The "Red Planet"
 - 10. The planet closest to the Sun
 - 11. Number of stars in the Big Dipper
 - 13. The distance light travels in one year
 - 17. An instrument that makes distant objects look larger and closer
 - 19. The spinning of the Earth on its axis
 - 20. Small rocky objects that revolve around the sun, mostly in the area between Mars and Jupiter
- DOWN**
- 2. A scientist who studies stars and planets
 - 3. A star much larger than our sun
 - 5. A group of stars with a definite pattern or arrangement
 - 7. A star's brightness is called its _____.
 - 8. The largest planet in our solar system
 - 12. Another name for the North Star
 - 14. A large group of stars, gas and dust
 - 15. The movement of the Earth around the Sun
 - 16. The planet with rings
 - 18. A mass of material with a long tail that travels around the Sun

Story time
Down and Out

A sudden lurch, and then the ship was in motion. Ogby averted her gaze from the windows; the sight of the Boarding Station dropping away beneath her would do little to calm her nerves. The altimeter needle on the control panel was rising rapidly; they were already a full kilolength above standard ground. Six more and they'd be at the top of the ocean. "This is your first time up, too?" Vyrv asked her. "Yes," chromed Ogby. "I've spent a lot of time in these ships, but never way up here." "Oh?" Vyrv seemed surprised. "Where, then? Down in the Deeps? Didn't think there was much down there. Just ice."

"Th ere has to be something ," Ogby insisted. "Whirlpools must go somewhere ." Roov joined his colors into the conversation, ignoring the controls now that the counterweight was lifting them at the proper speed. "Whirlpools are an anomaly; everyone knows that ice is heavier than water. The way I see it, natural causation moves downward, with us Rygors the ultimate consequence at the bottom. Think about it. We eat the fish, which in turn eat the microscopic life, which in turn feed off the vents we've found above. But what powers the vents? What's above the Above? Why does the ground fl ex in such a predictable rhythm? When we get to the top I'll show you the new excavation; we've dug higher up into the rock than ever before. I'm sure that one day we'll break through to Outside, fi nd out that our ocean is just a small part of a much bigger universe."

"You believe in Outside?" Vryv asked wryly. "Th ere must be an Outside," chromed Roov in all seriousness. "Yrvo's voyage proved that you can drift around the world, proved the ocean is a spherical shell. Something has to be outside." "Not necessarily," fl ashed Ogby, hoping she wasn't being too impertinent. "For all we know, the rock up there goes out to infi nity."

Roov turned his full attention in her direction, and paused before responding. "Instead of trying to disparage our work, you might take a look at your own. You've been digging in the ice for a kilofl ex, and what have you discovered?"

Ogby didn't respond. In all of her Deep excavations, she had found precious little of interest. All of the major new discoveries had been made above: the new elements, the new lifeforms, the Vents, the bubble factories. Below she had found only ice. "I'm not disparaging you," Ogby insisted. "I would like very much to join your team." "If so," chromed Roov, "the fi rst thing you're going to have to do is prove you can handle the height."

Roov's colors dimmed and little else was discussed for the remainder of the journey. Eventually the ship lurched to a halt. Th ey had arrived at the top of the ocean. After docking with the main habitat, the hatch opened and warm water diffused into the cabin. This was a curious fact no one had yet explained, Ogby knew. Up here the water was slightly warmer than down below. Yet the super-hot water from the Vents was heavy and carried the nutrients straight down to the bottom of the ocean. It didn't make sense to her, but then again, a lot of things about gravity didn't make sense. Ogby was the second passenger to step out into the cylindrical walkway. The corridors were thinly air-cushioned; not so deep that she couldn't get traction, but still more comfortable than a solid floor. Roov began the tour when everyone had left the ship. "Over here," he chromed, "are the intake valves. Specially designed to keep the water fresh without changing the interior pressure. But I'm sure you'll be more interested in the Vents. Come this way."

As Ogby approached the observation deck she had a premonition of disaster. Yes, she was interested in the Vents, but somehow she hadn't considered that in order to see outside of the habitat there must be windows. And with windows, she might look down . There would be no pretending that she was in a structure at the bottom of the ocean; her tremendous height was about to become very obvious. Th e thought made her fingers twitch in nervous anticipation. And the reality was even worse. Instead of simply a room with glass portholes in the walls, the floor was also covered with small windows. She forced her attention upward before stepping in. The observation deck was a circular platform built next to a particularly large Vent. The Vent itself looked like a narrow upside-down seamount, made out of rock instead of ice. Ogby kept her gaze high, examining the less-interesting upper portions of the Vent. Streaks of color told most of the geological story; some sort of material had sprayed out of the bottom of the Vent and then oozed up the sides before solidifying. But the others were all looking through the floor, filling the room with color as they chromed their appreciation. Reluctantly, curiously, Ogby lowered her gaze.

It was a fantastic display. Superhot squirts of water pulsed regularly from the opening, so hot that they glowed in the far red. Th e surrounding water was also quite warm; a faint glow surrounded the entire bottom half of the Vent. Ogby had never seen natural light before. To her, all light came from animals, Rygors, or Rygor-made objects like sonoluminescent lamps. On some primal level she felt the natural beacon summoning her, just as it must have summoned the creatures that teemed in the red glow. There were no familiar deep-water fi sh, but plenty of new species: a fi sh with far more fins than seemed necessary, another organism shaped like a slow-moving net, even a little 5-legged cutie which looked almost like a miniature Rygor. This was where life started, she knew. This was where she needed to be. Up here she could fi nd the answers she was looking for, fi gure out how the world worked. Down below lay only....

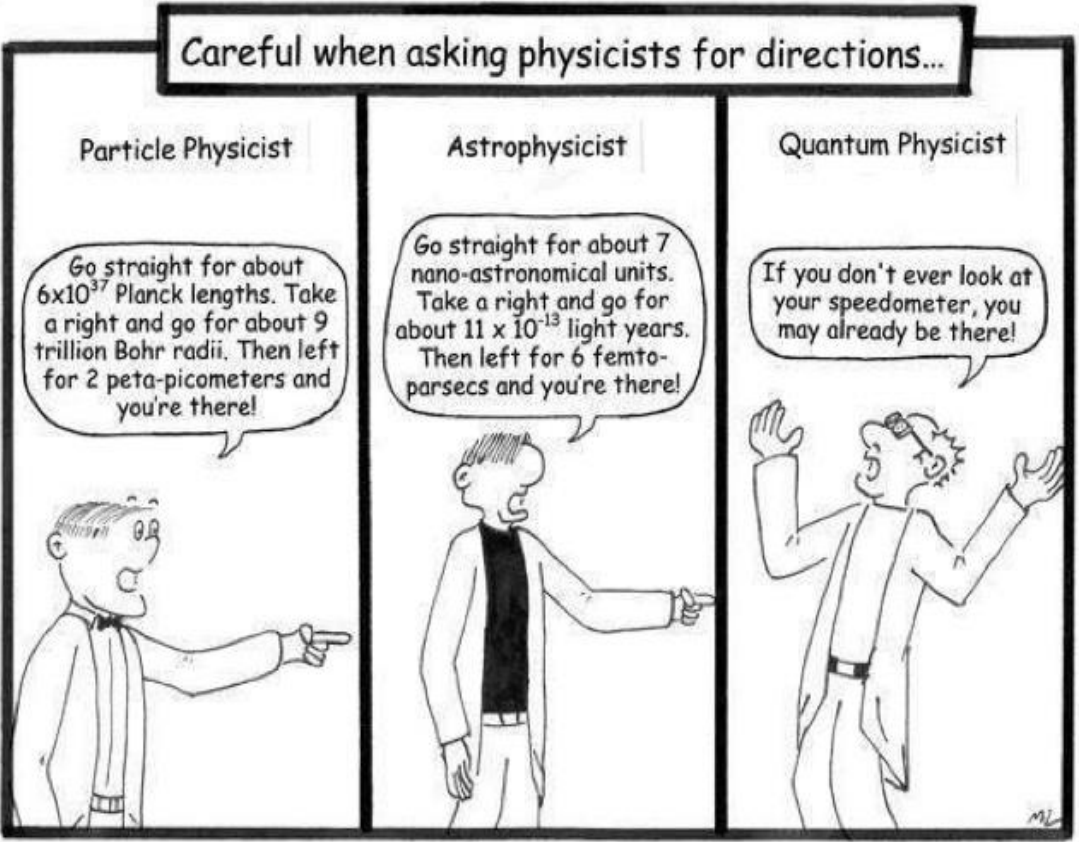
Down below.

Ogby couldn't help herself, and once she looked down it was impossible to stop. There were tiny lights down there, she saw, swimming against the black background. Black, because the bright lights from the cities couldn't reach these heights. The distance hit her all at once. I'm too high, she thought. I'm too high. Now the others were trying to talk to her, trying to get her to respond, but she didn't dare move. She wanted more than anything to get back to the ship, to get back to the ground, but she couldn't even walk off the deck.

She dimly realized she was being carried somewhere, with her eyes closed. Still, the fear wouldn't stop. "WAKE," someone soned at her, the sound reverberating painfully from the habitat walls. She felt herself shutting down, ancient survival mechanisms having their way with her body. At last her consciousness drifted deeper than even the bottom of the ocean, and all was dark.

"You've got to get back out there," Boro insisted, back in Ogby's underground web three fl exes later.

Ogby watched her mate disinterestedly, wondering if she'd even keep him for another season. "What does it matter?" she chromed dimly. "I had one chance. I blew it. Roov won't let me try again." Boro shook his middle legs before continuing. "I'm not telling you to get back up there. Just get back to work. There's plenty of interesting science you can do down here. The techs in the factory have been asking about you since yesterflex." "I don't want to do science anymore," she responded. "I just want to be left alone."



Think out of the Box

- 1. Why Physics Book is always Unhappy?
- 2. You answer me, although I never ask you questions. What am I?



I have numbers on my face but I can't find 13 any place. What am I?

"So you're through? You can't go Above, so instead you're just going to quit everything?" Boro turned away from her, but continued to chrome from his back. "What about your pressure calculations? I know you still think there's something under the ice." "NO," she soned at him, but Boro didn't even turn around. In fact, now he was leaving, just like she had asked. She almost soned him to STOP, but her pride kept her quiet, and soon he was out of the web completely. Still, maybe Boro was right. After seeing the splendor of the Vents and the mysteries they contained, she had forgotten about the more mundane problems she studied down here. The physics had been known even to the ancients. A flexible bladder of air would change its size depending on elevation, and that in turn would change its weight. The fact that bladder size was proportional to weight had been known for hundreds of generations, possibly even megaflexes. But only recently, using the new excavators, had anyone been able to measure the effect deep below ground level. Ogby herself had spearheaded the largest excavation yet, melting a kilolength deep into the ice. Roov was correct that she hadn't discovered anything down there, but she had discovered that the gravity continued to rise, even deep underground. And when she extrapolated the curve, it looked like gravity should go to infinity just 2.8 kilolengths below standard ground. According to most other scientists, this was nonsense. Infinities were mathematical, not real. Yes, the ocean was a spherical shell, so they admitted something odd might happen down at the very center. But based on the calculations from Yrvo's round-the-world voyage, the distance to the center should have been megalengths, not kilolengths. No, the other scientists insisted, the change in gravity must slow with depth.

But despite the soundness of their logic, Ogby's numbers had shown no such trend. The only way to test it, she knew, was to dig down to minus 2.8 kl and see what happened. But at the rate she was going, it would take more than her lifetime to get that far.

Continue...

Let's Joke with Physics

After graduating in Science I knew a little about everything. Then I got My Graduate and I know everything about Physics. Now I am PhD and I learn more and more about less and less. Now I know everything about nothing

Aother one

- Q:** Where does bad light end up?
A: In a prism.
"Prism" sounds like "prison." A prism is used to separate white light into colors.

Accidental Discoveries in Physics (Invention of Colors)

In the early 18th century, German chemist Johann Jacob Diesbach was at work in a laboratory trying to make a red pigment out of cochineal insects, the tiny bugs whose extract dyes everything from food to lipstick. Diesbach hypothesized that he could combine the carmine extract with alum, iron sulfate, and potash to make the pale red hue he desired. There was a problem, though. The potash Diesbach used had been contaminated, which altered the chemical makeup of his pigment. Instead of red, Diesbach had unwittingly created something far more valuable: a deep ocean-like blue. For centuries, blue was considered one of the rarest of pigments, found only in small quantities in nature. Pigments like lapus lazuli, made from a metamorphic rock of the same name, was said to have a value akin to precious metals like gold. But thanks to Diesbach's chemical mishap, the pigment could now be made synthetically; faster, cheaper, and in greater quantities than ever before. Diesbach's blue, called Prussian Blue, is considered one of the first synthetic colors to ever have been made. Since then, we've found many more.

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