



COMSATS PHYSICS TODAY

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OFF RAIWIND ROAD LAHORE

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Biogas

**An energy project of Department of Physics CIIT Lahore for
lifting Poverty & Education Level in Rural Areas**

Supervisors: Dr. Syed Javaid Iqbal & Dr. Muhammad Ashfaq Ahmad

The most important for improving a country is to educate its people. But how to educate the people who are dirt poor. Poverty force parents to send their children to work. We can not educate children with out elevating their poverty level. Specially those people who live far away from the cities. Usually these people have small piece of land and few animals. CIIT Lahore wants to help them in such a way that they can stand on their own feet. One way of doing this is to install biogas plant. As saying goes, if a person ask for a fish, then don't give him fish, teach him how to catch fish then he will not be asking for fish, same way we don't want to give money to poor farmers rather we teach them how to earn and save money. In this way we will be able to produce honorable citizens.

A rough estimate of putting a biogas plant on their land is given in the table on page 2. This calculations shows a small farmer with ten buffalos/cows installed a biogas unit which will cover its own cast of installing within six month, and rest of the time he will be saving about 90,000 rupees/annum which will be enough for him to send his children to the school.

Biogas Plant: A case Study

Muhammad Anwar

Plant Size = 10 m³

Family Members = 12

Number of Animals = 10

Installation = June, 2009

Gas Production = July, 2009

Location: Kotra Tehsil Talagang Distt. Chakwal

Total Cost: 41,000/- (PDDC Has shared 50% of the total cost)

Before Biogas Plant (Per month)		After Biogas Plant (Per month)	
LPG = 2 Cylinder	Rs: 18,00/-	LPG	0
Wood = 3 mond	Rs: 900	Wood	0
Dung Cakes	Own	Dung Cakes	0
Peter Generator	112.5 L /month (7312 Rs)	36 L /month	2340 Rs. /month
Total	Rs: 10,012 /-	Total	Rs.2,340

Per month saving will be = 7,672/-

Per Annum saving will be = 92,064/-

Above calculation shows that even if the PDDC (Pakistan Dairy Department Company) does not contribute 50%, then first year saving will be Rs. 71546 and subsequent year saving will be Rs.92064/year

This type of plant last 20 to 30 years. On the top of that manure which comes out of this bio-gas plant is one of the best fertilizer. For this size of the plant it can easily fertilized about 6 acres of land. Usually when this fertilizer is used i.e for wheat, the production of the wheat increases from 25mond to 40mond per acre, which is equivalent to $15 \times 6 \times 890 = 80100$ plus all the saving for not buying fertilizer. In short former with 10 animals and 6 acres of land will be saving around 1.5 lakh rupees. This saving is more than enough for him to educate his few children.

Initially our director gave us a project go find a village with buffalos/cows and make them free from buying cooking gas. At second stage make them free electricity bill for lighting and third stage make them free of electricity bill for tube wall. We at physics department take this challenge seriously. InshaAllah we will do it together. We have already collected expertise and have visited few successful biogas plants. We already have prepared 10 and 500 animals proposed, we already have at least found five different costumer who will be installing biogas.

A Biogas Plant at Phool Nagar



Lets Get Together

A Lunch With MS Physics Students

An executive lunch was arranged to welcome MS –Physics Batch-1 in January 2010 in the Officers Club CIIT Lahore. The event was organized by Dr. Hafiz Ashfaq Ahmad (Assistant Professor). The Director Dr. Shaukat Ali Hayat, Dr. Syed Javaid Iqbal along with other Heads of Departments, faculty and officers graced the occasion with their presence.

BS Physics Welcome (Batch-6)

The beautiful convention of welcome parties continued its way in next semester .The faculty and the students once again gathered to welcome the junior most batch on the eve of March 01 2010.The Batch 5 students Anam and Sana conducted the stage very nicely. while different batches performed skits and games to amuse the audience .The Director CIIT, senior faculty and HoD's of other Departments also attended the occasion. The highlight of the event remained the spectacular performances of the faculty members. Undoubtedly, this student-teacher interaction and bonding is the hallmark of COMSATS Physics Department.

Events in Picture



Promotion in the Physics Department

Dr. Muhammad Asif Becomes Associate Professor

The month of January brought the news of promotion for Dr. Muhammad Asif and his wife Dr. Anila Asif (IRCBM), who cordially invited the faculty and other CIIT Personals on a grand lunch arranged in executive officers club CIIT Lahore. Dr. Muhammad Asif has been selected as Associate professor under the CIIT promotion rules. Many congratulations to Dr. Muhammad Asif and Dr. Anila Asif

Memorable glimpses of Party



Faculty Research Publications

1. M. Asif "Relationship between normalized thermal energy and conductivity for cylindrical tokamak geometry", Natural Science vol. 2 (2010) 54.
2. M. Asif "Magnetohydrodynamic equations for toroidal plasmas", Natural Science vol. 2 (2010) 95.

Faculty Participation in International Training Program at Lancaster University UK

We are pleased to share the news that two of our faculty members viz Dr. Muhammad Ashfaq Ahmad and Dr. Muhammad Asif visited Lancaster University UK for two weeks between 21.02.2010 and 02.03.2010. During their stay, they completed a course of training entitled, **"Successor Generation Heads of Department -- Training program"**. The training took place at the main campus of Lancaster University UK.



New Faculty
Joined
The Department

Miss Faiza Mustafa

Qualification:

M. Phil (Electronics)
from Quad-e-Azam University
Islamabad

Lecturer

Transferred from CIIT Islamabad



Mrs. Shaheen Irfan

Qualification:

M. Phil (High Energy Physics)
from University of the Punjab

Lecturer

Transferred to
Lancaster Block CIIT Lahore.



Students in Extracurricular activities

The BS (Phy)-5 student
Hafiz Burhan Ahmad won
3rd position in Naat Competition
held in CIIT premises on March



Research Corner

Carbon Nano-Tubes (CNTs)

BY DR. ABDUL RASHID

Carbon can form single, double or triple covalent bonds with other carbon atoms. Carbon single bonds are sp^3 hybrid bonds pointing in tetrahedral (diamond) structure. Carbon can form a wide range of compounds this is why it has its own chemistry, *organic chemistry*. Up to 1980 we were familiar with only three allotropes of crystalline carbon; cubic diamond, hexagonal diamond and graphite. Today there is a whole family of other forms of carbon. The first to be discovered was the hollow, cage-like buckminsterfullerene molecule - also known as the buckyball, or the C_{60} fullerene[1-3]. There are now thirty or more forms of fullerenes, and also an extended family of linear hollow structures called carbon nano-tubes. Possibly even more important than fullerenes are carbon nano-tubes, which are related to graphite. The structure of graphite resembles stacked, one-atom-thick sheets of chicken wire - a planar network of interconnected hexagonal rings of carbon atoms. In conventional graphite, the sheets of carbon are stacked on top of one another, allowing them to easily slide over each other (Fig. 2). That is why graphite is not hard, but it feels greasy, and can be used as a lubricant. When graphene sheets are rolled into a cylinder and their edges joined, they form CNTs. A carbon nano-tube may consist of one sheet of graphene or a number of concentric tubes called multiwalled carbon nanotubes (MCNTs). There are different types of CNTs, because the graphitic sheets can be rolled in different ways. The three types of CNTs are Zigzag, Armchair, and Chiral. Single-walled carbon nanotubes (SWNTs) encapsulating fullerenes, so-called "peapods," are attracting materials for electronics applications because of their interesting electronic properties. There are many different processes to produce CNTs like CVD [4, 5], LCVD, arc discharge, ball milling etc.

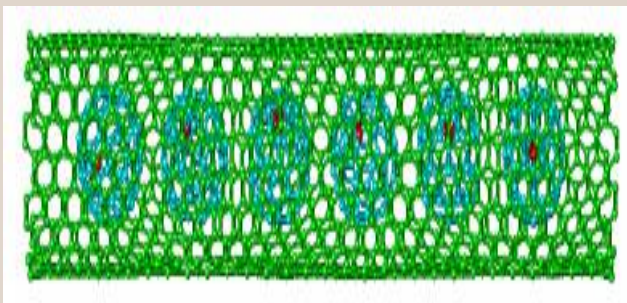


Fig. 1: Carbon Peapod

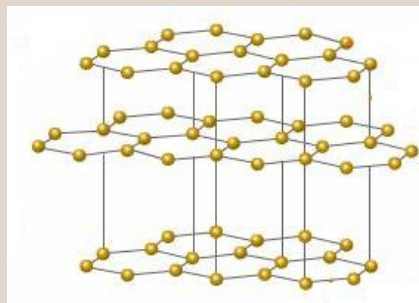


Fig. 2: Graphite

Properties of CNTs

CNTs exhibit a broad range of unique electronic, thermal, mechanical and structural properties. The remarkable electronic properties of CNTs are due to radial confinement of electrons by monolayer thickness of graphene sheet. Periodic boundary conditions around the circumference of CNTs cause the quantum confinement of electrons in one dimension.

1. ELECTRICAL CONDUCTIVITY

CNTs can be metallic or semiconducting depending on their configuration. The unique electronic properties of CNTs are due to quantum confinement of electrons in their walls. Owing to periodic boundary conditions around the circumference electrons are confined to move only in axial direction. The resistivity of the single wall carbon nanotube is of the order of 10^{-4} Ωcm at room temperature and maximum current density is $\sim 10^{13}$ A/m^2 [6-8].

2. STRENGTH AND DEFORMABILITY

Depending on the size and chirality the typical value of Young's modulus of SWNT ranges from 1.22 TPa to 1.26 TPa and ~ 1.28 TPa for MWNT. The tensile strength of SWNTs ranges from 13-52 GPa, whereas for MWNTs it ranges from 11-63 GPa.

3. Thermal conductivity of carbon nanotubes

The thermal conductivity of CNTs depends upon the temperature. They exhibit superconductivity below 20 K. The typical value of thermal conductivity of CNTs at room temperature is $2000 \text{ W/m}\cdot\text{K}$ [9,11].

4. High aspect ratio

CNTs having small diameter and long length represent high aspect ratio (> 10000) and thus are prominent candidates for conductive additive for all kinds of plastics.

5. Highly absorbent

CNTs are very inert and sensitive to physically desorb the species on the graphene walls rather than react chemically. The large surface area and high absorbency of CNTs make them ideal candidates for use in air, gas, and water filtration.

APPLICATIONS OF CNTs

Carbon nanotubes are one of the most promising new materials. There are numerous applications of CNTs in different fields of science, including new emerging nano-technologies. A few of their applications are summarized below:

- Scanning probe tips
- Hydrogen storage
- Fuel and solar cells
- Field effect display
- Physical, chemical and biological sensors
- Supercapacitors and transistors
- Quantum wires
- Conductive plastics
- Computer memory
- Energy storage
- Fibers and fabrics

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1. M. Wilson *et al.* Nanotechnology: Basic Science and Emerging Technologies UNSWR Press, 2002.
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6. J. C. Charlier, Acc. Chem. Res. **35**, 1063 (2002).
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Faculty Corner

An Interview with Dr. Syed Javaid Iqbal

By

A n a m R a m z a n b a t c h - 5

Date of Birth /\$tar

March 22/Aries

Qualification

I did my Metric from Government College for Boys Baghbanpura and FSc . from Government Degree College Baghbanpura .Then did my BSc from Islamia College Civil Lines while MSc (Physics) from Government College Lahore. Later I went to Western Michigan University USA to complete my MS . I did my PhD from University Malaya Kulalumpur, Malaysia.

How was your childhood?

I came from a decent family. Initially, till 8th grade I was bullied by other boys around me till I started rebutting them.

Something about your student life

I was born in relatively poor family . After F.Sc, I spent my time in studying and giving tuitions. Especially in BSc., I was very active in extra curricular activities like hiking, boating etc. I have been physically very active throughout my life.

The best thing about being a teenager

I do things without knowing the consequences and I love it.

Your dream was to become ...

I had many dreams . First I wanted to a become an army officer, then a preacher and now to help the poor who have nobody to turn to.

Ragging at college/university

(Laughs) I was never ragged, rather I did it.

What hurt you the most?

When my dream of becoming an army officer was shattered , as I failed in ISSB exams twice.

Relation with your siblings/subordinates

I have fantastic relations with my siblings . As far as subordinates are concerned, in first twelve years I didn't like people around me as I was beaten up by them. Afterwards, when I started beating up other people I enjoyed it a lot.

How a Physics student should look and behave like?

A Physics student should always be curious about “ why things work, the way the things work”

Which movie you have seen the most?

Terminator 1, 2, 3

You always love to listen..

Old Indian song “ zindagi ka safar ,hay yeh kaisa safar ,koi samja nahi , koi jana nahi”

You could not stand to?

Telling a lie on the face

Your favorite hang out?

I like nature, gardens beaches, river. Actually inside I am a village boy (paindo).

Favorite actor/ actress

Ashok Kumar/none

Favorite book

Basically I like historical books but especially abnormal psychology because generally every body is abnormal to some degree depending on the situation.

Your room wall; carried the posters

Pakistan Air force because of elder brother who was in Pakistan air force.

Your favorite quotation

Nothing is impossible “ success of a person depends how much a person understand nature and its rules because better you understand nature and follow it, better the chances of success here and there after.

If you were given a chance to bring a change in COMSAT, what will be the first thing you will change?

(laughs) I would like to change the attitude of the people towards nature and people.

If you want to impress anybody, what will you do?

Well! I don't want to impress anybody . I want to be the way I am.

Who do you think is the most iconic personality in COMSAT?

Dr. Dilawari (Chemical Engineering)

Your Ideal

Hazrat Mosa (A.S)

Bismarck and General Erwin Rommel

If a person is continuously staring at you , what will you think?

(laughs) I am a very positive person, I will assume the person likes me.

What do you write in autographs?

How to become a successful Pakistani.

Define yourself In three words

Dynamic, persistent, and hopeful

Something about your marriage

I am married to Norma Awan Had, she is a Malaysian national. I was of the view that I should marry the person who cares for me rather than a person whom I care and this theory worked in my case.

Any message for subordinates

Trust in God, never stop, don't wait for the result and do good.

Message for students

Your success is our success, never think nobody cares, we care, we are making sure that we leave you a better world, please do the same for those come after you.

Physics behind the nature

If you run really fast, you gain weight, this doesn't make sense to diet planners and exercise instructors but according to the theory of relativity, if a body has to move with speed of light, lot of energy has to be given to it, and as mass and energy are equivalent so this energy has to go somewhere, therefore it is converted to mass. This change is negligible at human speeds but if somebody reaches to an appreciable fraction of speed of light, its mass starts increasing rapidly.

Join COMSATS Physics Forum

Objectives of the Forum

- ✦ Arrangement of Seminars / workshops
- ✦ Arrangement of educational trips
- ✦ Organization of Co-Curricular activities e.g. Quiz competition, Research and general paper reading contest etc

Free Membership Open For All

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