





Participants (16)


Find a participant


 Pakistan Academy of Engineering (Host, me)

 Lu Jun CAE


 Afzal Haque


 Alex Sun -CETC

 Dr Nasim Akhtar Khan


 Dr. Shahid Alam

 Fatima

 Jibran Rashid

 M Faisal Khan

 MA

 Mohammad Khan

 Mustafa Sharief

 Muzammil

 Syed Mushahid Hussain Hashmi

 Zaheer



Invite

Mute All



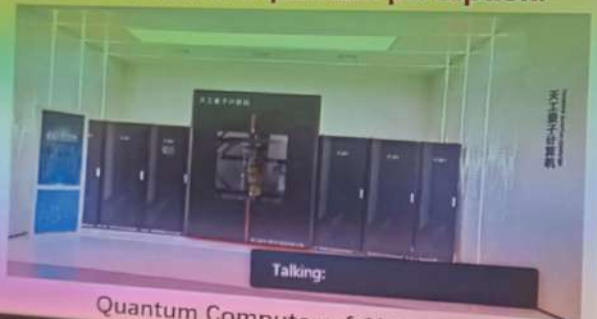
Recording--

## Current Status of the Development for Quantum Computing

**First Quantum Revolution**  
Macro quantum behavior yields **electronic information technology**, including transistor, integrated circuit and micro-processor, promotes the development of **electronic computation, electronic communication and electronic perception.**



**Second Quantum Revolution**  
Micro quantum behavior yields **quantum information technology**, including quantum transistor, memory and random number generator, leverages the development of **quantum computation, quantum communication and quantum perception.**



Quantum Computer of China





إِنَّا كُلَّ شَيْءٍ خَلَقْنَاهُ بِقَدَرٍ



Pakistan Academy of Engineering



Member

INTERNATIONAL COUNCIL OF ACADEMIES OF ENGINEERING AND TECHNOLOGICAL SCIENCES (CAETS)



21<sup>st</sup> Symposium

Quantum Computing

August 28, 2021

Co-Sponsored:



Pakistan Science Foundation





اَللّٰهُمَّ صَلِّ وَسَلِّمْ وَحَقِّقْهُ بِقَدْرِ

**PAE** Pakistan Academy of Engineering

Member

INTERNATIONAL COUNCIL OF ACADEMIES OF ENGINEERING AND TECHNOLOGICAL SCIENCES (CAETS)



21<sup>st</sup> Symposium

**Quantum Computing**

August 28, 2021

Co-Sponsored:

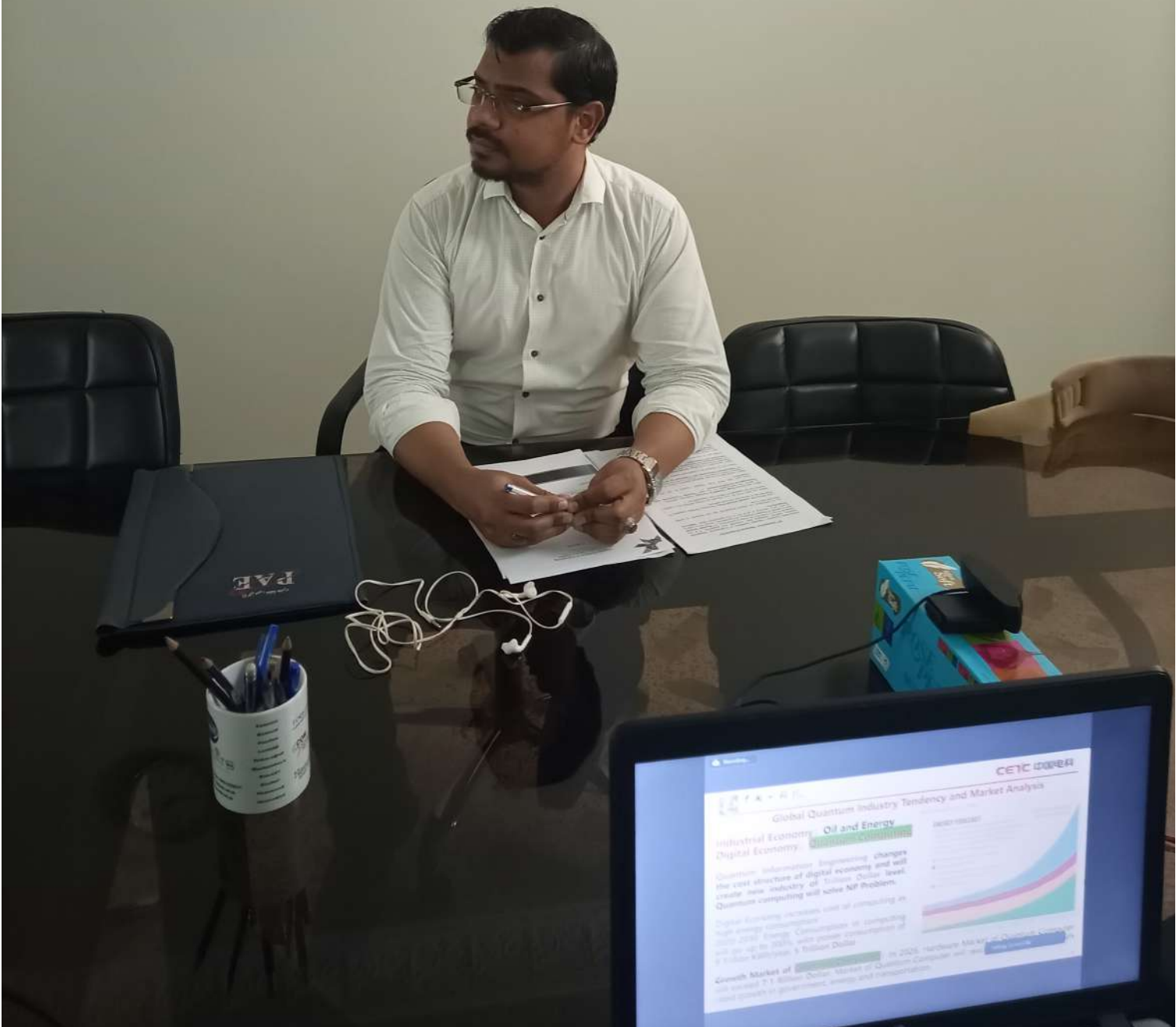


Pakistan Science  
Foundation











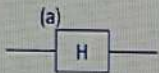
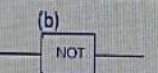
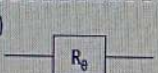
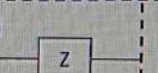
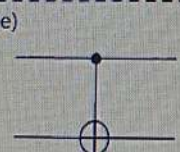




# Quantum Algorithm

## Quantum logic gate operation

Quantum gate operations are simple logic gate superimposition

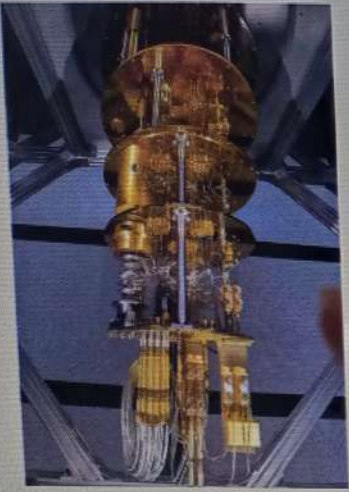
	Single Quantum Bit Gate:				(e) Double Quantum Bits Gate: CNOT Gate
	(a) Hadamard Gate	(b) NOT Gate	(c) phase-shift gate	(d) Pauli-Z Gate	
Quantum Gate Symbol and Operator	 $H = \frac{1}{\sqrt{2}} \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix}$	 $NOT = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$	 $R_\theta = \begin{bmatrix} 1 & 0 \\ 0 & e^{i\theta} \end{bmatrix}$	 $Z = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$	 $U_{CNOT} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}$
Math Expression of Quantum Bit	Single Quantum Bit: $ q_i\rangle = \alpha_0 0\rangle + \alpha_1 1\rangle = \alpha_0 \begin{pmatrix} 1 \\ 0 \end{pmatrix} + \alpha_1 \begin{pmatrix} 0 \\ 1 \end{pmatrix}$				Double Quantum Bit: $ q_i q_j\rangle = \alpha_0 00\rangle + \alpha_1 01\rangle + \beta_0 10\rangle + \beta_1 11\rangle = \alpha_0 \begin{pmatrix} 1 \\ 0 \\ 0 \\ 0 \end{pmatrix} + \alpha_1 \begin{pmatrix} 0 \\ 1 \\ 0 \\ 0 \end{pmatrix} + \beta_0 \begin{pmatrix} 0 \\ 0 \\ 1 \\ 0 \end{pmatrix} + \beta_1 \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \end{pmatrix}$
Quantum Gate Operator	Target $ q\rangle = \text{Quantum Gate} * \text{Initial }  q_i\rangle$				Target $ q\rangle = \text{Quantum Gate} * \text{Initial }  q_i q_j\rangle$

Universal quantum computing can be realized through quantum logic gates' combinations and operations

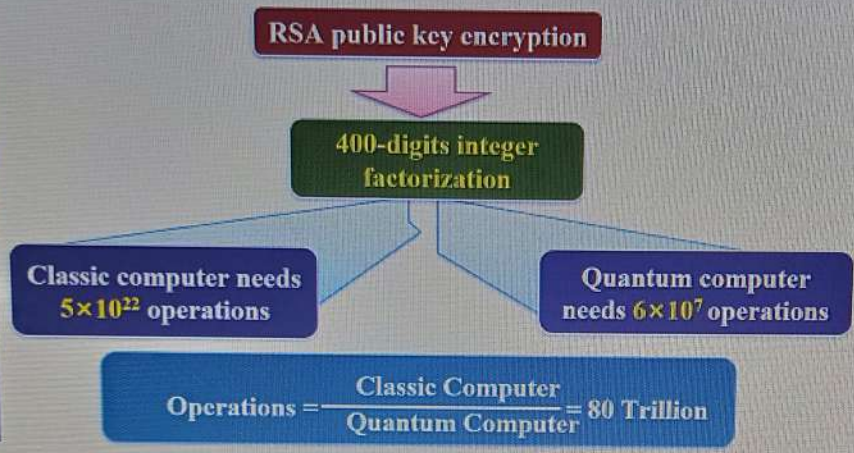
Talking: Lu Jun CAE



### Quantum Computing Challenges Current Cipher System



Quantum Computer of China



# Quantum Computers

Muhammad Sabieh Anwar  
*School of Science and Engineering*  
*LUMS, Lahore*

*Khwarizmi Science Society*

*Pakistan*

[sabieh@gmail.com](mailto:sabieh@gmail.com)







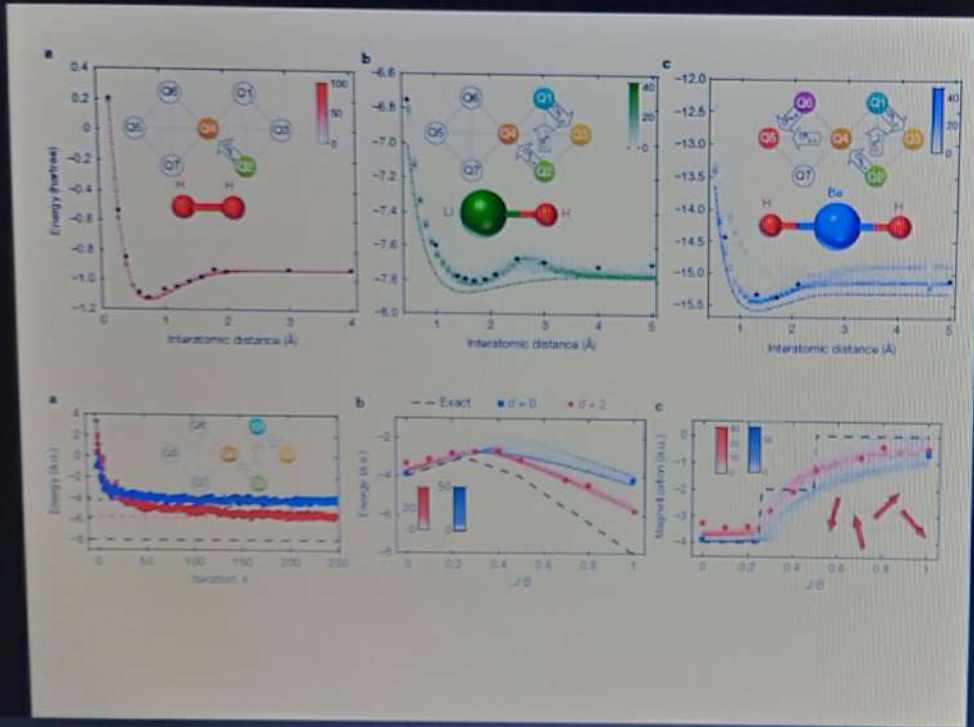
Recording...



You are viewing Sabieh Anwar's screen

View Options

View



Unmute

Stop Video

Security

Participants 30

Chat

Share Screen

Reactions

Apps

More

End

### Physics at the Turn of the Twentieth Century

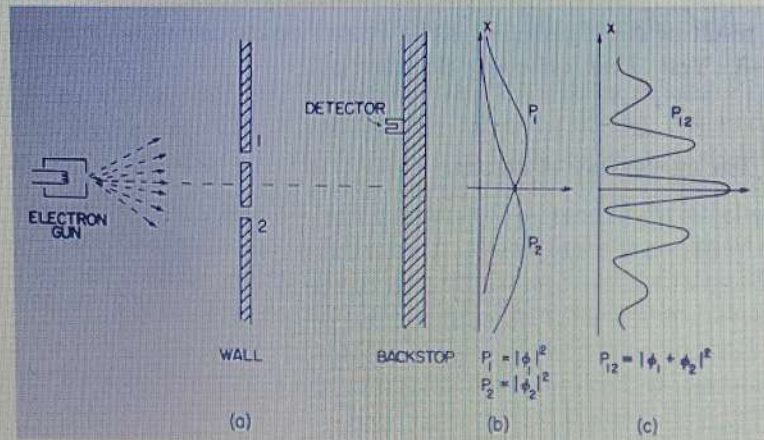
*"In a few years, all the great physical constants will have been approximately estimated, and ... the only occupation which will then be left to men of science will be to carry these measurements to another place of decimals."* (ca. 1900 A.D.)



Mustafa Sharief
















































### Electrons



Sabieh Anwar

Participants (35)

Find a participant

-  Pakistan Academy of Engineering (Host, me)   
-  Sabieh Anwar   
-  Afzal Haque  
-  Ahad Alvi 
-  Alex Sun -CETC  
-  Bilal Hyder  
-  Dr Irfan Ahmed 
-  Dr Nasim Akhtar Khan  
-  Dr. M. Imran Aslam  
-  Dr. Shahid Alam  
-  Dr. Shama Siddiqui DSU  
-  Dr. Sundus Ali  
-  Fahad Javed  
-  Fatima  
-  Gabriel Xiao-Guang Yue  

Invite

Mute All

...

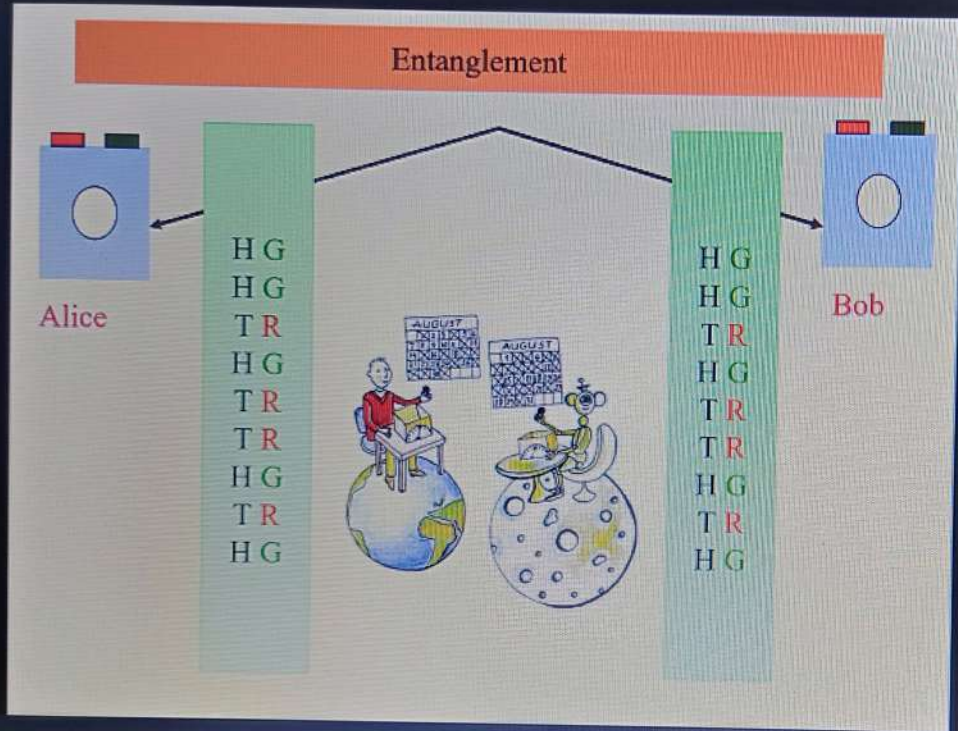


Syed Saad Luqman entered the waiting room

Admit

View

x



Unmute

Stop Video

Security

Participants 38

Chat

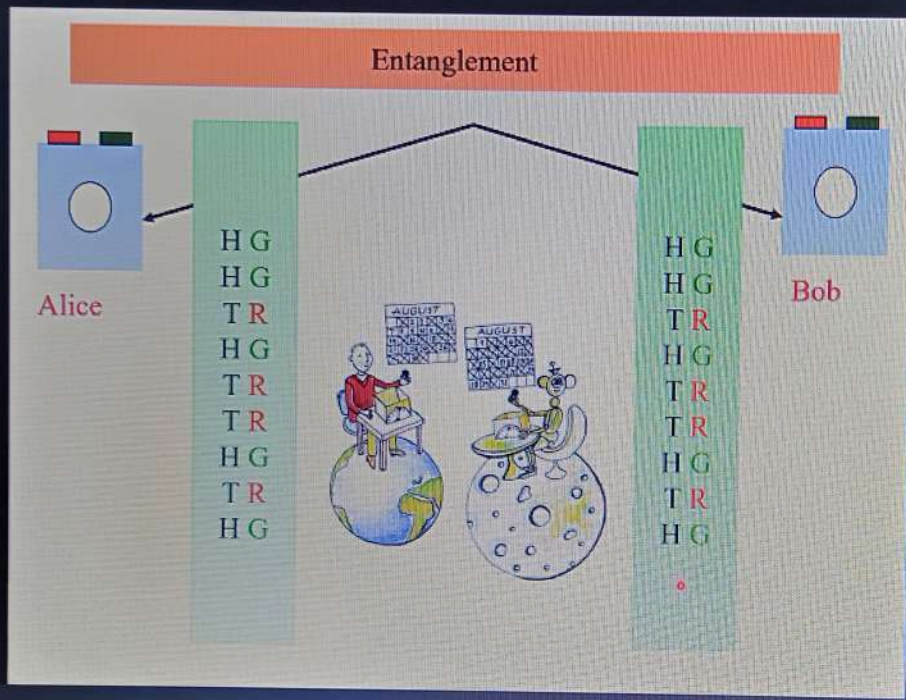
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Participants (40)

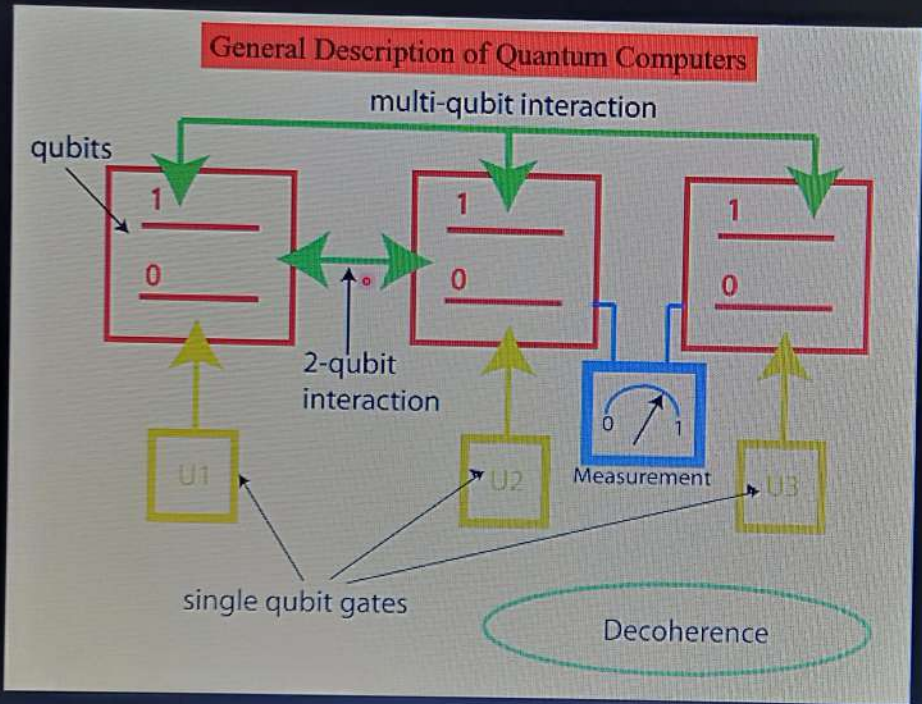
Find a participant

- Pakistan Academy of Engineering (Host, me)
- Sabieh Anwar
- Afzal Haque
- Ahad Alvi
- Alex Sun - CETC
- Dr Irfan Ahmed
- Dr Nasim Akhtar Khan
- Dr. Abid Karim
- Dr. M. Imran Aslam
- Dr. Shahid Alam
- Dr. Shama Siddiqui DSU
- Dr. Sundus Ali
- Fahad Javed
- Fatima
- Gabriel Xiao-Guang Yue

Invite

Mute All

...





Recording...

<b>Lu Jun CAE</b> Lu Jun CAE	Pakistan Academy of En...	Sabieh Anwar	<b>Dr. Shahid Alam</b> Dr. Shahid Alam
<b>Syed Mushahid...</b> Syed Mushahid Huss...	Mustafa Sharief	Dr. Sundus Ali	<b>Afzal Haque</b> Afzal Haque
<b>Jibran Rashid</b> Jibran Rashid	<b>Fatima</b> Fatima	Pakistan Academy of En...	M Faisal Khan
<b>Muzammil</b> Muzammil	<b>MA</b> MA	<b>Mohammad Khan</b> Mohammad Khan	Waqar Hassan
<b>Mohsina</b> Mohsina	<b>Muhammad Bilal</b> Muhammad Bilal	<b>Ahad Alvi</b> Ahad Alvi	<b>Dr Irfan Ahmed</b> Dr Irfan Ahmed
<b>Dr. M. Imran Asl...</b> Dr. M. Imran Aslam	Gabriel Xiao-Guang Y...	<b>Zaheer</b> Zaheer	<b>Muhammad Ay...</b> Muhammad Ayyaz

Participants (40)

Find a participant






- Pakistan Academ... (Host, me)
- Dr. Shahid Alam
- Mustafa Sharief
- Sabieh Anwar
- Afzal Haque
- Ahad Alvi
- Alex Sun -CETC
- Dr MM
- Dr Irfan Ahmed
- Dr Nasim Akhtar Khan
- Dr. Abid Karim
- Dr. M. Imran Aslam
- Dr. Shama Siddiqui DSU
- Dr. Sundus Ali

Invite Mute All ...



Recording...

Sabieh Anwar is talking...

<b>Mohsina</b> Mohsina	<b>Muhammad Bilal</b> Muhammad Bilal	<b>Ahad Alvi</b> Ahad Alvi	<b>Dr Irfan Ahmed</b> Dr Irfan Ahmed
<b>Dr. M. Imran Asl...</b> Dr. M. Imran Aslam	 Gabriel Xiao-Guang Y...	<b>Zaheer</b> Zaheer	<b>Muhammad Ay...</b> Muhammad Ayyaz
<b>Fahad Javed</b> Fahad Javed	<b>Jilani Yousuf</b> Jilani Yousuf	<b>Samia Masood</b> Samia Masood	<b>Imran</b> Imran
<b>Alex Sun -CETC</b> Alex Sun -CETC	<b>Dr. Abid Karim</b> Dr. Abid Karim	 M Usman Sharif (2kx...	<b>Dr Nasim Akhta...</b> Dr Nasim Akhtar Khan
<b>Muhammad zak...</b> Muhammad zakria Bu...	<b>Syed Saad Luqm...</b> Syed Saad Luqman	 Shehzad Saleem 108	 Sher Ali
 Wardah Mahmood	<b>Sohail P. Ahmed</b> Sohail P. Ahmed	<b>Dr MM</b> Dr MM	<b>Dr. Shama Siddi...</b> Dr. Shama Siddiqui D...

Participants (40)

Find a participant

Waiting Room (1)

Message

usama Hassan x9 cs 09

Joined (40)

- Pakistan Academ... (Host, me)
- Mustafa Sharief
- Sabieh Anwar
- Afzal Haque
- Ahad Alvi
- Alex Sun -CETC
- Dr MM
- Dr Irfan Ahmed
- Dr Nasim Akhtar Khan
- Dr. Abid Karim
- Dr. M. Imran Aslam

Invite

Mute All

...



Recording...

Dr. Shahid Alam is talking...

<b>Muhammad Bilal</b> Muhammad Bilal	<b>Ahad Alvi</b> Ahad Alvi	<b>Dr Irfan Ahmed</b> Dr Irfan Ahmed	<b>Dr. M. Imran Asl...</b> Dr. M. Imran Aslam
 Gabriel Xiao-Guang Y...	<b>Zaheer</b> Zaheer	<b>Muhammad Ay...</b> Muhammad Ayyaz	<b>Fahad Javed</b> Fahad Javed
<b>Jilani Yousuf</b> Jilani Yousuf	<b>Samia Masood</b> Samia Masood	<b>Imran</b> Imran	<b>Alex Sun -CETC</b> Alex Sun -CETC
<b>Dr. Abid Karim</b> Dr. Abid Karim	 M Usman Sharif (2k...	<b>Dr Nasim Akhta...</b> Dr Nasim Akhtar Khan	<b>Muhammad zak...</b> Muhammad zakria Bu...
<b>Syed Saad Luqm...</b> Syed Saad Luqman	 Shehzad Saleem 108	 Sher Ali	 Wardah Mahmood
<b>Sohail P. Ahmed</b> Sohail P. Ahmed	<b>Dr MM</b> Dr MM	<b>Dr. Shama Siddi...</b> Dr. Shama Siddiqui D...	<b>usama Hassan x...</b> usama Hassan x9 cs 09

Participants (41)

Find a participant

- Pakistan Academ... (Host, me)
- DS Dr. Shahid Alam
- LJ Lu Jun CAE
- SA Sabieh Anwar
- Mustafa Sharief
- AH Afzal Haque
- AA Ahad Alvi
- AS Alex Sun -CETC
- DM Dr MM
- DI Dr Irfan Ahmed
- DN Dr Nasim Akhtar Khan
- DA Dr. Abid Karim
- DM Dr. M. Imran Aslam
- DS Dr. Shama Siddiqui DSU

Invite Mute All

# Quantum Money



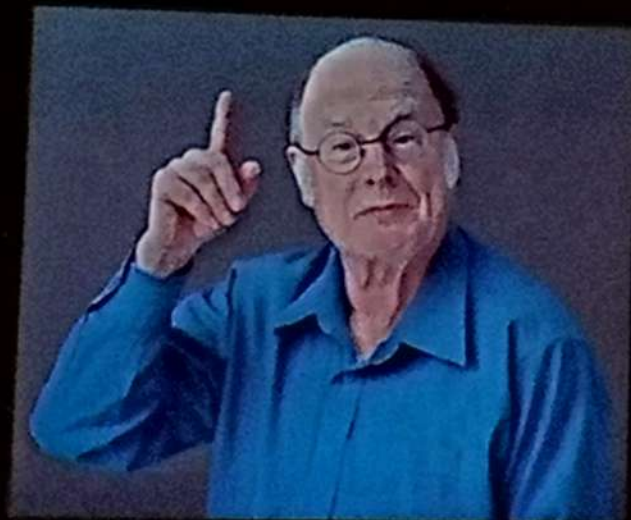
Stephen Wiesner (1942-2021)



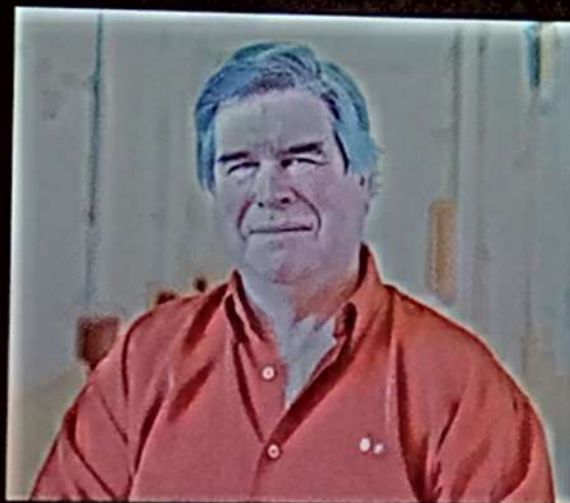


Recording...

# Quantum Key Distribution – BB84



Charles Bennett



Gilles Brassard



Recording...



**Syed Mushahid...**

Syed Mushahid Hussain Ha...



Ulbran Rashid

**Dr. Shahid Alam**

Dr. Shahid Alam



Muhammad zakria Bugti



Pakistan Academy of Engineer...

**Jilani Yousuf**

Jilani Yousuf



Sableh Anwar



Mustafa Sharief

**Lu Jun CAE**

Lu Jun CAE



Dr. Nasim Akhtar Khan



Afzal Haque



Waqar Hassan

**Zaheer**

Zaheer



Gabriel Xiao-Guang Yue

**Fatima**

Fatima



Pakistan Academy of Engineer...



M Faisal Khan

**MA**

MA

**Mohammad Khan**

Mohammad Khan

**Dr. M. Imran Asl...**

Dr. M. Imran Aslam

**Fahad Javed**

Fahad Javed

**Samia Masood**

Samia Masood

**Syed Saad Luqm...**

Syed Saad Luqman

**Asif Sadeeq**

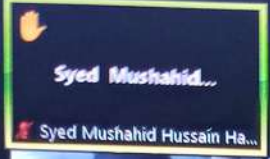
Asif Sadeeq



Muhammad Faseeh



Recording...



**Syed Mushahid...**  
Syed Mushahid Hussain Ha...

**Dr. Shahid Alam**  
Dr. Shahid Alam



Pakistan Academy of Engineer...



**Sabieh Anwar**



**Mustafa Sharief**



**Jibrán Rashid**



**Muhammad zakria Bugti**

**Jilani Yousuf**  
Jilani Yousuf



**Dr Nasim Akhtar Khan**

**Lu Jun CAE**  
Lu Jun CAE



**Afzal Haque**



**Waqar Hassan**

**Zaheer**  
Zaheer



**Gabriel Xiao-Guang Yue**

**Fatima**  
Fatima



Pakistan Academy of Engineer...



**M Faisal Khan**

**MA**  
MA

**Mohammad Khan**  
Mohammad Khan

**Dr. M. Imran Asl...**  
Dr. M. Imran Aslam

**Fahad Javed**  
Fahad Javed

**Samia Masood**  
Samia Masood

**Syed Saad Luqm...**  
Syed Saad Luqman

**Asif Sadeeq**  
Asif Sadeeq



**Muhammad Faseeh**

Recording...

 Syed Mushahid Hussain Ha...	 Pakistan Academy of Engineer...	 Dr. Shahid Alam	 Sabieh Anwar	 Mustafa Sharief
 Jibran Rashid	 Jilani Yousuf	 Dr Nasim Akhtar Khan	 Lu Jun CAE	 Muhammad zakria Bugti
 Gabriel Xiao-Guang Yue	 Waqar Hassan	 Mohammad Khan	 Afzal Haque	 MA
 Fahad Javed	 Fatima	 Pakistan Academy of Engineer...	 M Faisal Khan	 Syed Saad Luqman
 Asif Sadeeq	 Muhammad Faseeh	 Akbar Ali	 Hi	 Samia Masood





Pakistan Academy of Engineer...



Dr. Shahid Alam



Sabieh Anwar



Mustafa Sharief



Jibran Rashid

Jilani Yousuf

Jilani Yousuf



Dr Nasim Akhtar Khan



Lu Jun CAE



Muhammad zakria Bugti



Gabriel Xiao-Guang Yue



wazir Hassan



Mohammad Khan



Afzal Haque



MA



Fahad Javed



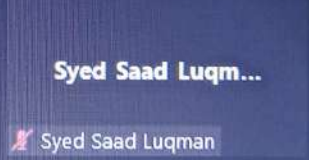
Fatima



Pakistan Academy of Engineer...



M Faisal Khan



Syed Saad Luqm...

Syed Saad Luqman



Asif Sadeeq

Asif Sadeeq

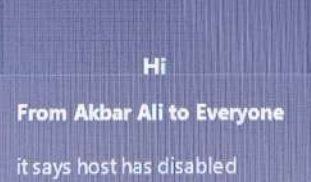


Muhammad Faseeh



Akbar Ali

Akbar Ali



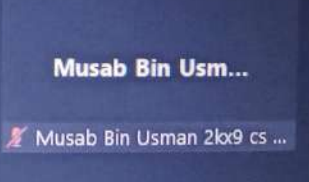
Hi

From Akbar Ali to Everyone  
it says host has disabled



Samia Masood

Samia Masood



Musab Bin Usm...

Musab Bin Usman 2lx9 cs ...



Mute



Stop Video



Security



Participants 26



Chat



Share Screen



Reactions



Apps



More



End





Pakistan Academy of Engineer...



Dr. Shahid Alam



Sableh Anwar



Mustafa Sharief



Jibran Rashid /

Jilani Yousuf

Jilani Yousuf



Dr. Nasim Akhtar Khan



Lu Jun CAE



Muhammad zakria Bugti



Gabriel Xiao-Guang Yue



HASSAN



Mohammad Khan



Afzal Haque



MA



Fahad Javed



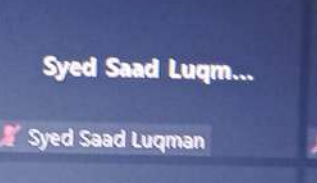
Fatima



Pakistan Academy of Engineer...



M Faisal Khan



Syed Saad Luqm...

Syed Saad Luqman



Asif Sadeeq

Asif Sadeeq

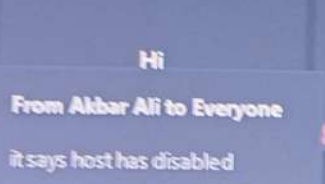


Muhammadi Fasseeh



Akbar Ali

Akbar Ali



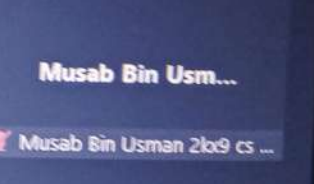
Hi

AA From Akbar Ali to Everyone  
it says host has disabled



Samia Masood

Samia Masood





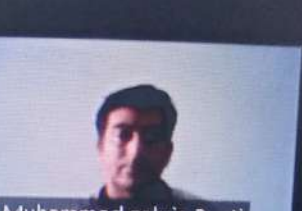












Musab Bin Usm...

Musab Bin Usman 2lo9 cs ...





 <p>Sabieh Anwar</p>	 <p>Pakistan Academy of Engineer...</p>	 <p>Jibran Rashid</p>	 <p>Dr Nasim Akhtar Khan</p>	 <p>Muhammad zakria Bugti</p>
 <p>Gabriel Xiao-Guang Yue</p>	 <p>Waqar Hassan</p>	 <p>Afzal Haque</p>	 <p>Dr. Shahid Alam</p>	 <p>Lu Jun CAE</p>
 <p>Fatima</p>	<p>Syed Mushahid...</p> <p>Syed Mushahid Hussain Ha...</p>	<p>Mohammad Khan</p> <p>Mohammad Khan</p>	<p>MA</p> <p>MA</p>	<p>Fahad Javed</p> <p>Fahad Javed</p>
 <p>Mustafa Sharief</p>	<p>Jilani Yousuf</p> <p>Jilani Yousuf</p>	 <p>Pakistan Academy of Engineer...</p>	 <p>M Faisal Khan</p>	<p>Syed Saad Luqm...</p> <p>Syed Saad Luqman</p>
<p>Asif Sadeeq</p> <p>Asif Sadeeq</p>	 <p>Muhammad Faseeh</p>	<p>From Gabriel Xiao-Guang Yue to Everyone</p> <p>Many many thanks, its a great symposium. I am obliged.</p>	<p>Hi</p> <p>Hi</p>	<p>Samia Masood</p> <p>Samia Masood</p>