ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES
(Affiliated to AU, Approved by AICTE &Accredited by NBA)
Sangivalasa-531162, Bheemunipatnam Mandal, Visakhapatnam Dt.
Phone: 08933- 225084,226395

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Report on Guest Lecture (online)

August 27, 2021

Topic: **Electrical modeling & Simulation on different kind of Solar Cell like Organic, Perovskite, Tandem, Heterojunction Solar Cell & LED using SETFOS Software**

Speaker: Mr. Anil kumar sharma, Director of Business Development, IMPULSE TECHNOLOGY, Gurugram, Haryana

Date : 26-08-2021

Time: 1.00 PM to 02.00 PM

Platform: online google meet : meet.google.com/epp-tmve-hbj

Recorded video link: https://drive.google.com/file/d/1EqsD794FP17stDS7jZMQqRrAId0LEclg/view

Target audience: B.Tech students and faculty

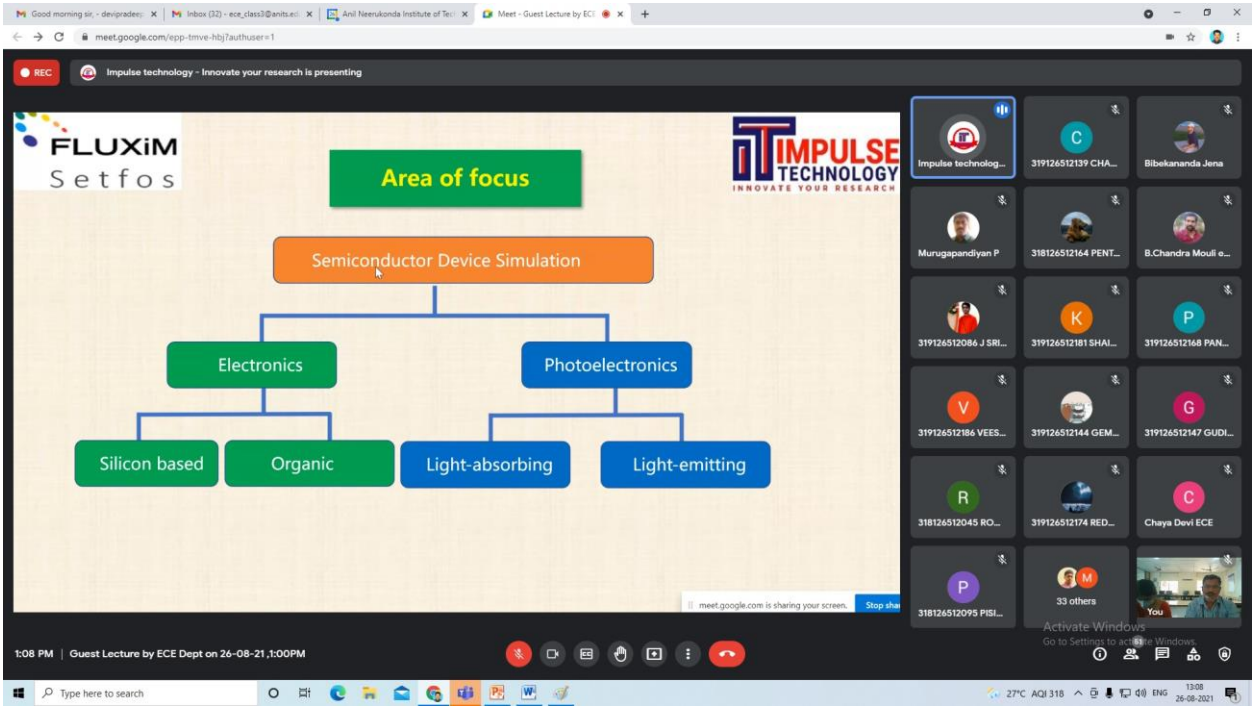
No of participants: 95

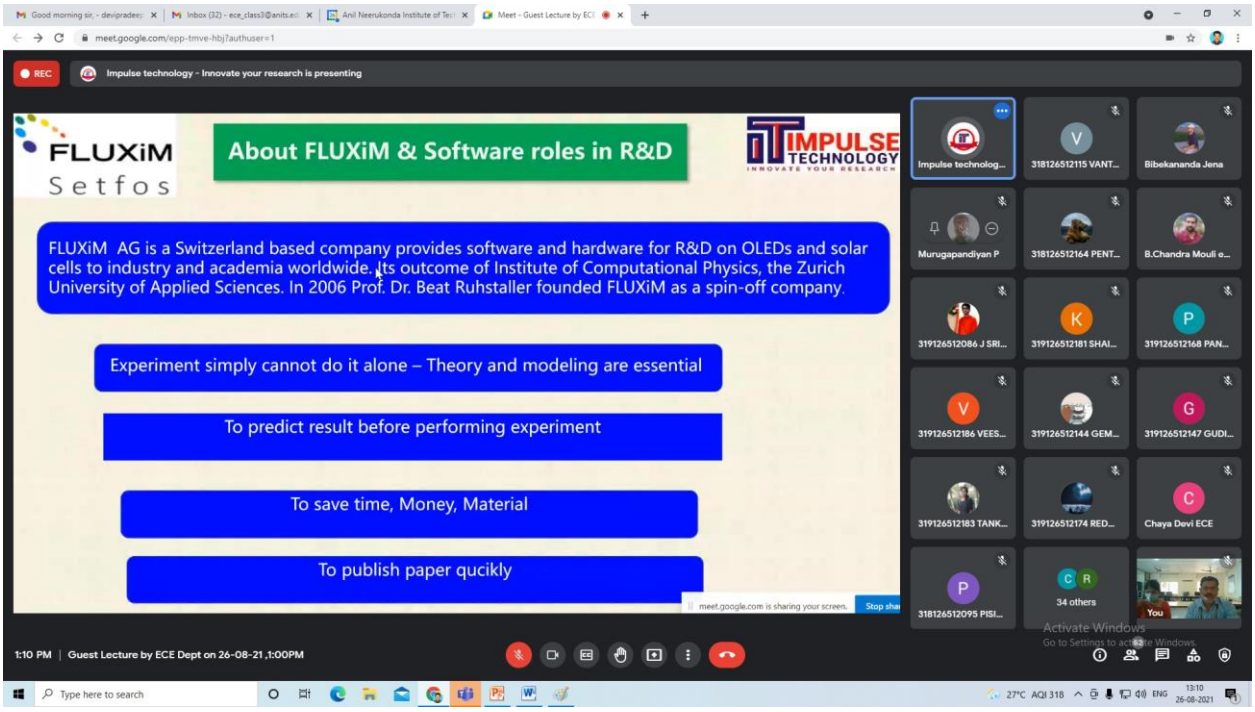
Organized by Department of **ECE** in association with IETE Student Forum.

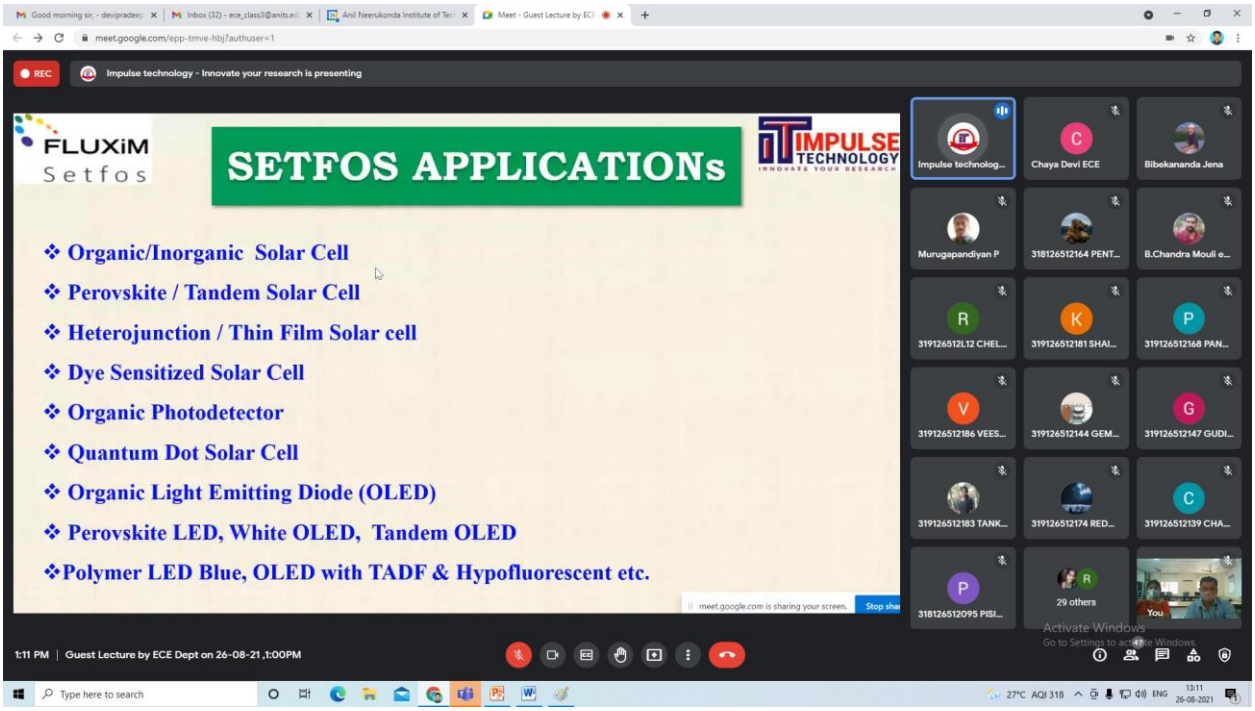
Report: Mr.Anil Kumar sharma had vast experience in the fields of optical and electrical modeling of solar devices. Sir was started his presentation from basics of semiconductor simulation targeted for electronics and photo electronics followed by SETFOS software details. Narrated all advantage and applications of SETFOS software. Demonstrated some examples using SETFOS software. He discussed about latest research trends and challenges in Solar cells.

Dr. V.Rajya Lakshmi,
Prof & HOD, ECE

Snap shots of guest lecture



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SETFOS APPLICATIONs
IMPULSE TECHNOLOGY
❖ Organic/Inorganic Solar Cell
❖ Perovskite / Tandem Solar Cell
❖ Heterojunction / Thin Film Solar cell
❖ Dye Sensitized Solar Cell
❖ Organic Photodetector
❖ Quantum Dot Solar Cell
❖ Organic Light Emitting Diode (OLED)
❖ Perovskite LED, White OLED, Tandem OLED
❖Polymer LED Blue, OLED with TADF & Hypofluorescent etc.
meet.google.com is sharing your screen.
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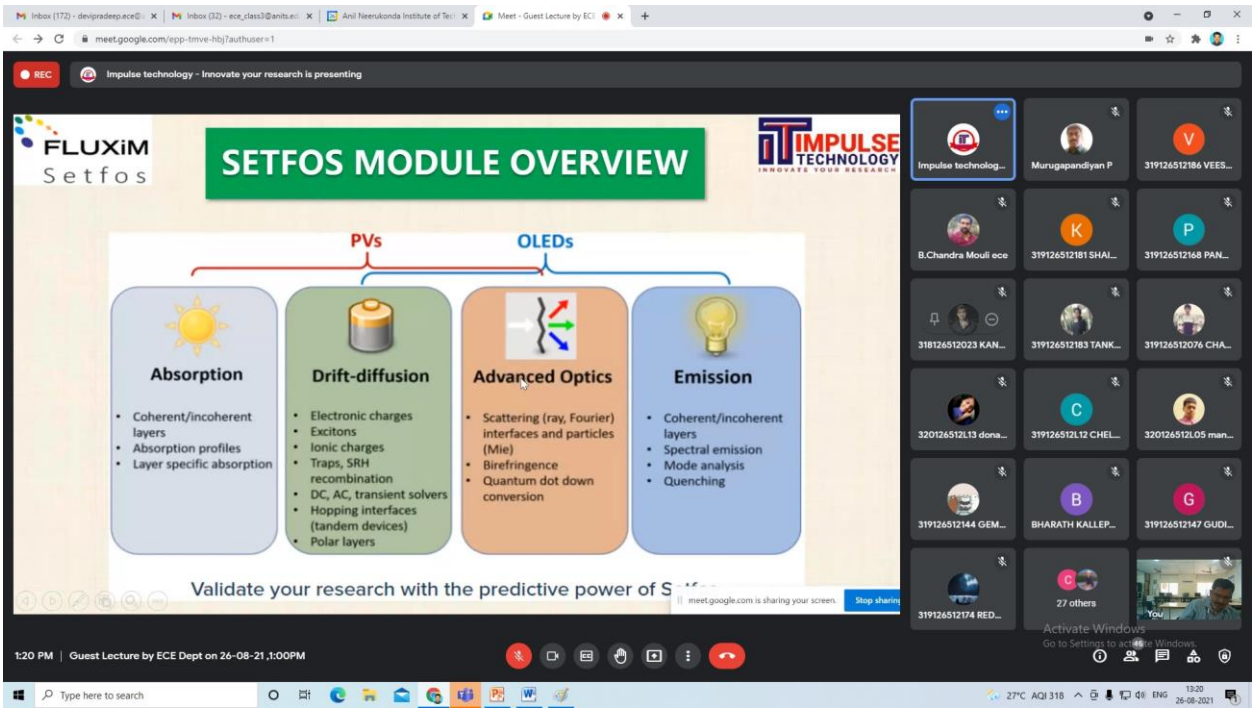
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SETFOS MODULE OVERVIEW
IMPULSE TECHNOLOGY
PVs
OLEDs
Absorption
Coherent/incoherent layers
Absorption profiles
Layer specific absorption
Drift-diffusion
Electronic charges
Excitons
Ionic charges
Traps, SRH recombination
DC, AC, transient solvers
Hopping interfaces (tandem devices)
Polar layers
Advanced Optics
Scattering (ray, Fourier) interfaces and particles (Mie)
Birefringence
Quantum dot down conversion
Emission
Coherent/incoherent layers
Spectral emission
Mode analysis
Quenching
Validate your research with the predictive power of S
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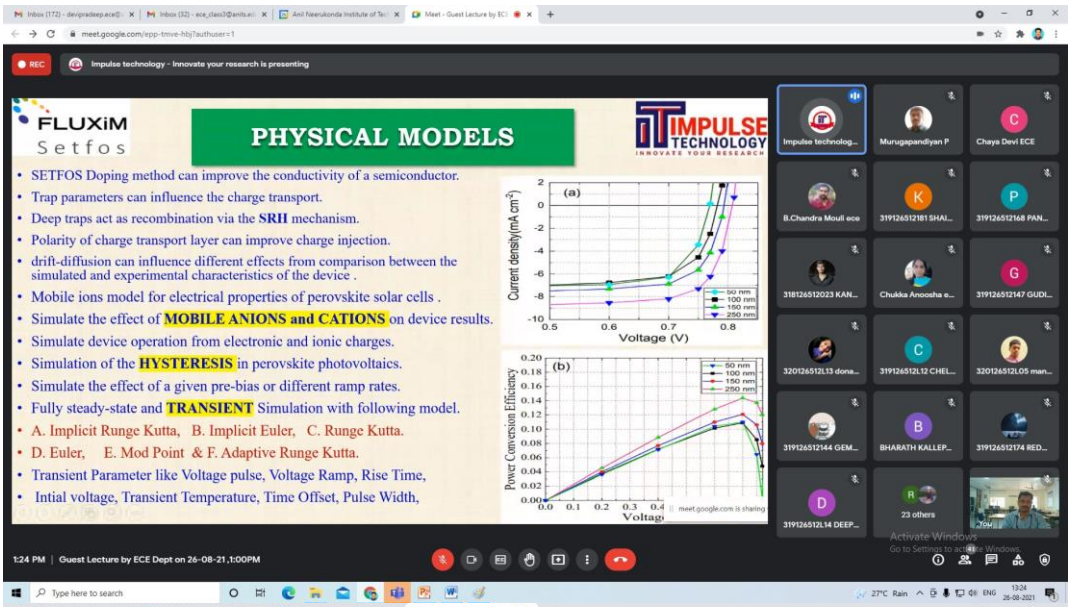
REC
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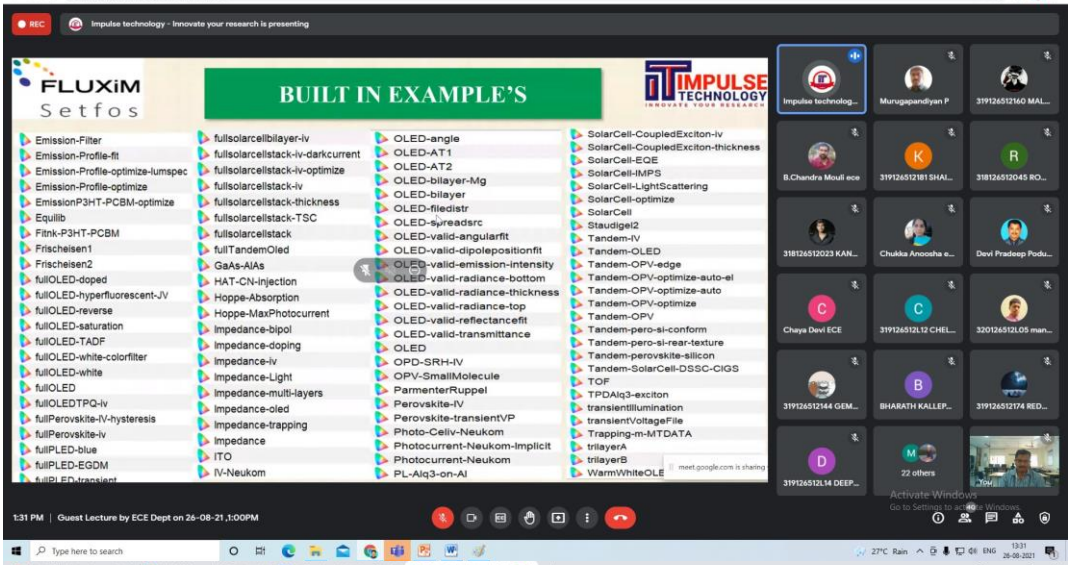
PHYSICAL MODELS
IMPULSE TECHNOLOGY
• SETFOS Doping method can improve the conductivity of a semiconductor.
• Trap parameters can influence the charge transport.
• Deep traps act as recombination via the SRH mechanism.
• Polarity of charge transport layer can improve charge injection.
• drift-diffusion can influence different effects from comparison between the simulated and experimental characteristics of the device .
• Mobile ions model for electrical properties of perovskite solar cells .
• Simulate the effect of MOBILE ANIONS and CATIONS on device results.
• Simulate device operation from electronic and ionic charges.
• Simulation of the HYSTERESIS in perovskite photovoltaics.
• Simulate the effect of a given pre-bias or different ramp rates.
• Fully steady-state and TRANSIENT Simulation with following model.
• A. Implicit Runge Kutta, B. Implicit Euler, C. Runge Kutta.
• D. Euler, E. Mod Point & F. Adaptive Runge Kutta.
• Transient Parameter like Voltage pulse, Voltage Ramp, Rise Time,
• Intial voltage, Transient Temperature, Time Offset, Pulse Width,
(a)
Current density(mA cm⁻²)
Voltage (V)
50 nm
100 nm
150 nm
250 nm
(b)
Power Conversion Efficiency
1:24 PM | Guest Lecture by ECE Dept on 26-08-21,1:00PM


REC
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BUILT IN EXAMPLE'S
IMPULSE TECHNOLOGY
Emission-Filter
Emission-Profile-fit
Emission-Profile-optimize-lumspec
Emission-Profile-optimize
EmissionP3HT-PCBM-optimize
Equilib
Fitnk-P3HT-PCBM
Frischeisen1
Frischeisen2
fullOLED-doped
fullOLED-hyperfluorescent-JV
fullOLED-reverse
fullOLED-saturation
fullOLED-TADF
fullOLED-white-colorfilter
fullOLED-white
fullOLED
fullOLEDTPQ-iv
fullPerovskite-IV-hysteresis
fullPerovskite-iv
fullPLED-blue
fullPLED-EGDM
fullsolarcellbilayer-iv
fullsolarcellstack-iv-darkcurrent
fullsolarcellstack-iv-optimize
fullsolarcellstack-iv
fullsolarcellstack-thickness
fullsolarcellstack-TSC
fullsolarcellstack
fullTandemOled
GaAs-AlAs
HAT-CN-injection
Hoppe-Absorption
Hoppe-MaxPhotocurrent
Impedance-bipol
Impedance-doping
Impedance-iv
Impedance-Light
Impedance-multi-layers
Impedance-oled
Impedance-trapping
Impedance
ITO
IV-Neukom
OLED-angle
OLED-AT1
OLED-AT2
OLED-bilayer-Mg
OLED-bilayer
OLED-filedistr
OLED-fsreadsrc
OLED-valid-angularfit
OLED-valid-dipolepositionfit
OLED-valid-emission-intensity
OLED-valid-radiance-bottom
OLED-valid-radiance-thickness
OLED-valid-radiance-top
OLED-valid-reflectancefit
OLED-valid-transmittance
OLED
OPD-SRH-IV
OPV-SmallMolecule
ParmenterRuppel
Perovskite-IV
Perovskite-transientVP
Photo-Celiv-Neukom
Photocurrent-Neukom-Implicit
Photocurrent-Neukom
PL-Alq3-on-Al
SolarCell-CoupledExciton-iv
SolarCell-CoupledExciton-thickness
SolarCell-EQE
SolarCell-IMPS
SolarCell-LightScattering
SolarCell-optimize
SolarCell
Staudigel2
Tandem-IV
Tandem-OLED
Tandem-OPV-edge
Tandem-OPV-optimize-auto-el
Tandem-OPV-optimize-auto
Tandem-OPV-optimize
Tandem-OPV
Tandem-pero-si-conform
Tandem-pero-si-rear-texture
Tandem-perovskite-silicon
Tandem-SolarCell-DSSC-CIGS
TOF
TPDAlq3-exciton
transientIllumination
transientVoltageFile
Trapping-m-MTDATA
trilayerA
trilayerB
WarmWhiteOLE
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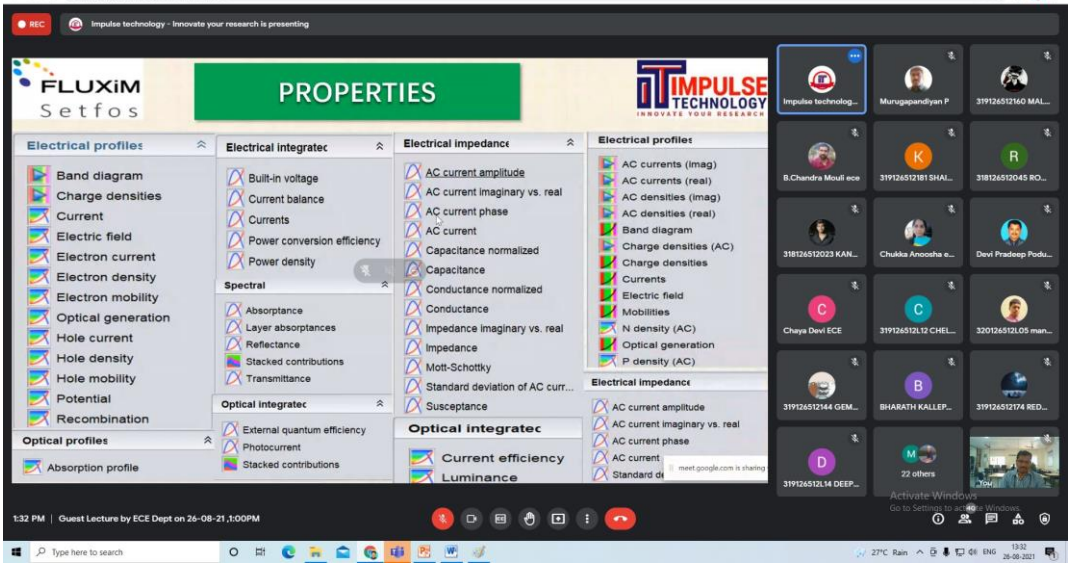
REC
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PROPERTIES
IMPULSE TECHNOLOGY
Electrical profiles
Band diagram
Charge densities
Current
Electric field
Electron current
Electron density
Electron mobility
Optical generation
Hole current
Hole density
Hole mobility
Potential
Recombination
Optical profiles
Absorption profile
Electrical integratec
Built-in voltage
Current balance
Currents
Power conversion efficiency
Power density
Spectral
Absorptance
Layer absorptances
Reflectance
Stacked contributions
Transmittance
Optical integratec
External quantum efficiency
Photocurrent
Stacked contributions
Electrical impedance
AC current amplitude
AC current imaginary vs. real
AC current phase
AC current
Capacitance normalized
Capacitance
Conductance normalized
Conductance
Impedance imaginary vs. real
Impedance
Mott-Schottky
Standard deviation of AC curr...
Susceptance
Optical integratec
Current efficiency
Luminance
Electrical profiles
AC currents (Imag)
AC currents (real)
AC densities (imag)
AC densities (real)
Band diagram
Charge densities (AC)
Charge densities
Currents
Electric field
Mobilities
N density (AC)
Optical generation
P density (AC)
Electrical impedance
AC current amplitude
AC current imaginary vs. real
AC current phase
AC current
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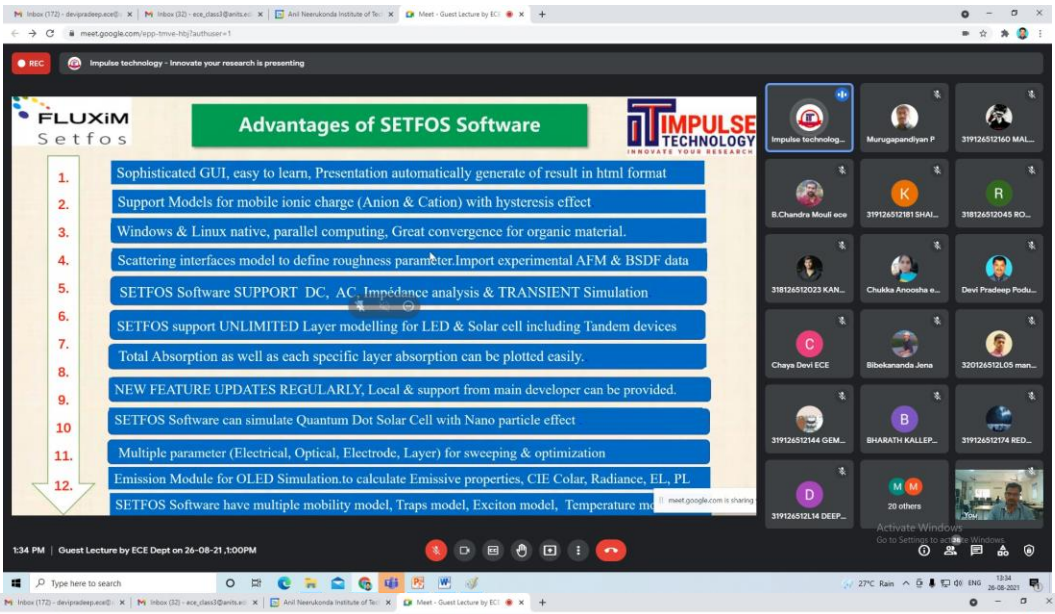
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Advantages of SETFOS Software
IMPULSE TECHNOLOGY
1. Sophisticated GUI, easy to learn, Presentation automatically generate of result in html format
2. Support Models for mobile ionic charge (Anion & Cation) with hysteresis effect
3. Windows & Linux native, parallel computing, Great convergence for organic material.
4. Scattering interfaces model to define roughness parameter.Import experimental AFM & BSDF data
5. SETFOS Software SUPPORT DC, AC, Impedance analysis & TRANSIENT Simulation
6. SETFOS support UNLIMITED Layer modelling for LED & Solar cell including Tandem devices
7. Total Absorption as well as each specific layer absorption can be plotted easily.
8. NEW FEATURE UPDATES REGULARLY, Local & support from main developer can be provided.
9. SETFOS Software can simulate Quantum Dot Solar Cell with Nano particle effect
10. Multiple parameter (Electrical, Optical, Electrode, Layer) for sweeping & optimization
11. Emission Module for OLED Simulation.to calculate Emissive properties, CIE Colar, Radiance, EL, PL
12. SETFOS Software have multiple mobility model, Traps model, Exciton model, Temperature
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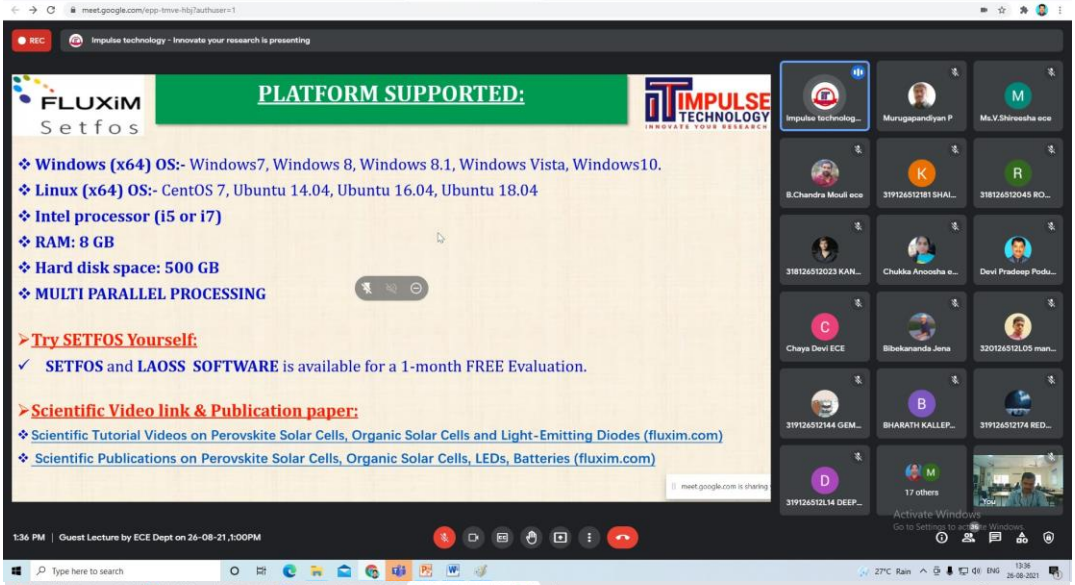
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PLATFORM SUPPORTED:
IMPULSE TECHNOLOGY
Windows (x64) OS:- Windows7, Windows 8, Windows 8.1, Windows Vista, Windows10.
Linux (x64) OS:- CentOS 7, Ubuntu 14.04, Ubuntu 16.04, Ubuntu 18.04
Intel processor (i5 or i7)
RAM: 8 GB
Hard disk space: 500 GB
MULTI PARALLEL PROCESSING
Try SETFOS Yourself:
SETFOS and LAOSS SOFTWARE is available for a 1-month FREE Evaluation.
Scientific Video link & Publication paper:
Scientific Tutorial Videos on Perovskite Solar Cells, Organic Solar Cells and Light-Emitting Diodes (fluxim.com)
Scientific Publications on Perovskite Solar Cells, Organic Solar Cells, LEDs, Batteries (fluxim.com)
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Impulse Technology (Indian Distributor)
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Email:- info@impulsetechnology.in
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Website: www.impulsetechnology.in
Add: Unit. No. 911, Vipul Business Park
Sector - 48, Gurugram, Haryana – 122018
"IMPULSE TECHNOLOGY" - Innovate Your Research"
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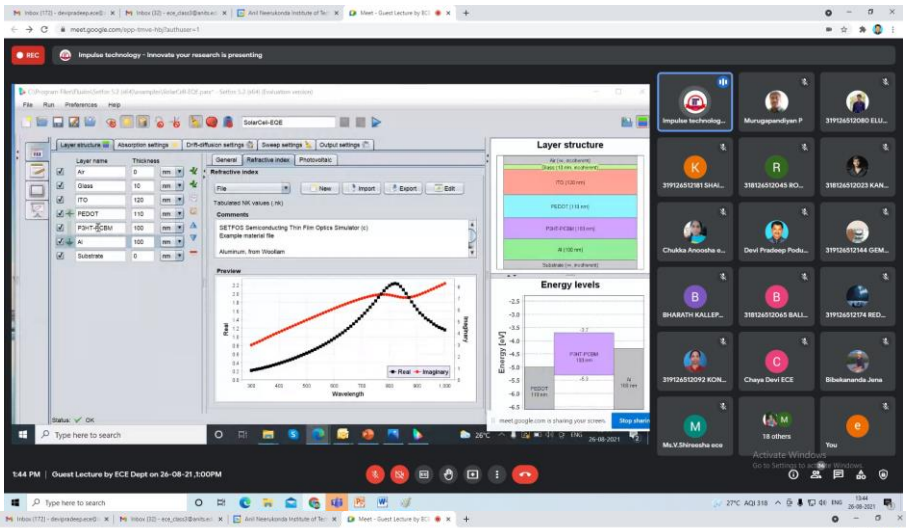
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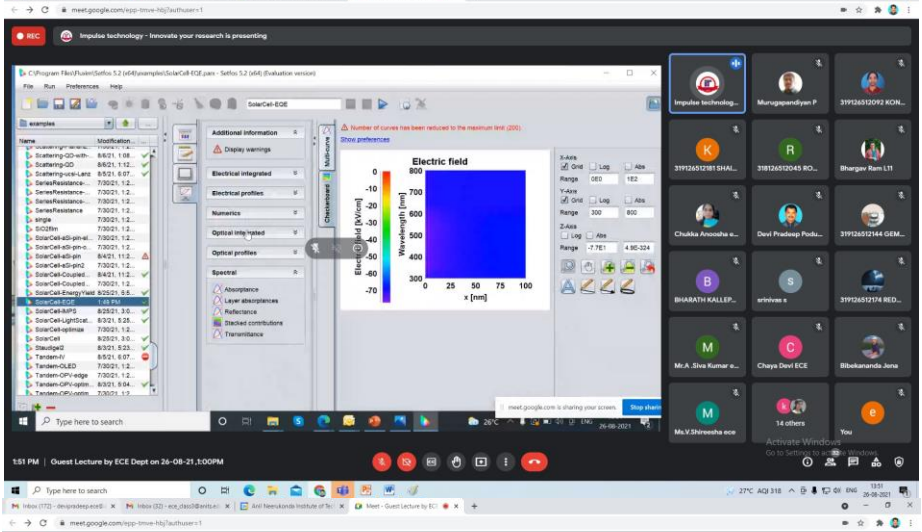
Layer structure
Energy levels
Preview
1:44 PM | Guest Lecture by ECE Dept on 26-08-21,1:00PM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Electric field
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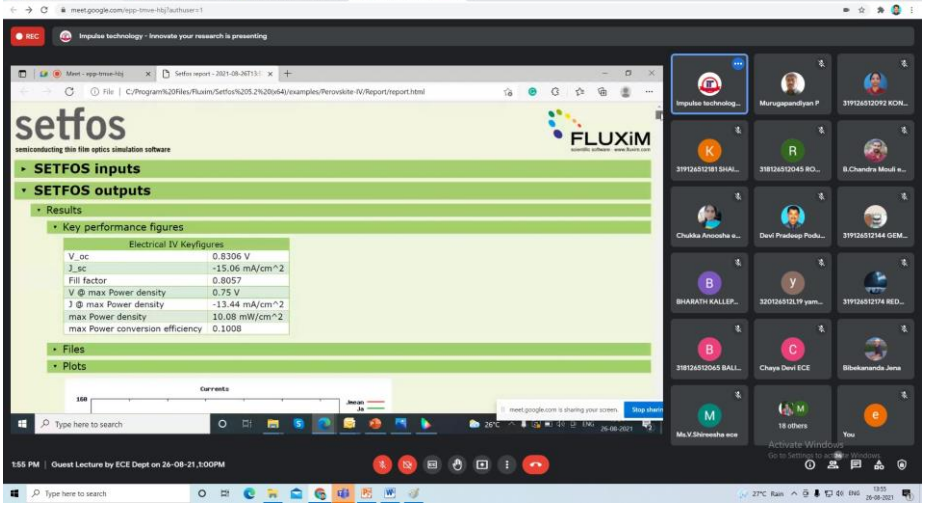
Impulse technology - Innovate your research is presenting
setfos
semiconducting thin film optics simulation software
FLUXiM
SETFOS inputs
SETFOS outputs
Results
Key performance figures
Electrical IV Keyfigures
V_oc 0.8306 V
J_sc -15.06 mA/cm^2
Fill factor 0.8057
V @ max Power density 0.75 V
J @ max Power density -13.44 mA/cm^2
max Power density 10.08 mW/cm^2
max Power conversion efficiency 0.1008
Files
Plots
1:55 PM | Guest Lecture by ECE Dept on 26-08-21,1:00PM

First name	Last name	Email	Duration	Time joined	Time exited
BHARATH KALLEPALLI		bharathkumar.2019.ece@anits.edu.in	1 hr 6 min	12:56 PM	2:02 PM
Dr.A.Lakshmi Narayana		lakshminarayana.ece@anits.edu.in	1 hr 3 min	12:23 PM	2:02 PM
ece.l21		yelugondavenkatadurgabhavani.le20.ece@anits.edu.in	49 sec	1:20 PM	1:21 PM
Ramkumar		ramkumar.ece@anits.edu.in	1 hr 11 min	12:51 PM	2:02 PM
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319126512076	CHAVALA KUMAR CHARUKESH	kumarcharukesh.2019.ece@anits.edu.in	1 min	1:20 PM	1:21 PM
319126512L12	CHELLABOYINA LALITHA DEVI	lalithadevi.2019le.ece@anits.edu.in	23 min	1:11 PM	1:34 PM
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ece	class3	ece_class3@anits.edu.in	1 hr 52 min	12:10 PM	2:02 PM
NAGAMANI	D	nagamani.ece@anits.edu.in	20 min	1:42 PM	2:02 PM
319126512L14	DEEPTHI DUNGALA	dungala.2019le.ece@anits.edu.in	35 min	1:00 PM	1:42 PM
320126512L13	donadrisupriya	donadrisupriya.le20.ece@anits.edu.in	11 min	1:13 PM	1:24 PM
318126512134	DOOBA DURGA SAI PRASANTH	durgasaiprasanth.2018.ece@anits.edu.in	19 min	12:51 PM	1:10 PM

319126512141	DWARASALA LAKSHMI PRASANNA	lakshmiprasanna.2019.ece@anits.edu.in	41 min	12:56 PM	2:01 PM
B.Chandra Mouli	ece	chandramouli.ece@anits.edu.in	29 min	1:07 PM	1:36 PM
Chukka Anoosha	ece	anoosha.ece@anits.edu.in	36 min	1:23 PM	1:59 PM
Gayatri Gorle	ece	gayatri.ece@anits.edu.in	4 min	12:55 PM	1:02 PM
M.Veena	ece	veena.ece@anits.edu.in	45 min	1:11 PM	2:02 PM
Mr.A .Siva Kumar	ece	sivakumar.ece@anits.edu.in	57 min	1:05 PM	2:02 PM
Mr.K.V.G.Srinivas	ece	srinivas.ece@anits.edu.in	11 min	1:45 PM	2:02 PM
Mr.Vijay Kumar Sahu	ece	vijaykumarsahu.ece@anits.edu.in	36 min	12:59 PM	1:35 PM
Ms.V.Shireesha	ece	shireesha.ece@anits.edu.in	55 min	1:06 PM	2:02 PM
prasanna	ece	prasanna.ece@anits.edu.in	58 min	1:03 PM	2:02 PM
DeepaKundala	Ece	deepa.ece@anits.edu.in	1 hr	1:01 PM	2:02 PM
Chaya Devi	ECE	chayadevi.ece@anits.edu.in	49 min	1:07 PM	1:56 PM
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319126512148	HARSHITH GANJI	ganji.2019.ece@anits.edu.in	13 min	1:00 PM	1:13 PM
Impulse technology -	Innovate your research	impu**********@***.com	1 hr 11 min	12:50 PM	2:02 PM
318126512142	JAVVADI BHAVANI	bhavani.2018.ece@anits.edu.in	53 min	12:51 PM	2:02 PM
Bibekananda	Jena	bjena.ece@anits.edu.in	1 hr 9 min	12:18 PM	2:02 PM
319126512086	J SRI RAM PRATEEK	sriramprateek.2019.ece@anits.edu.in	18 min	12:52 PM	1:10 PM
318126512023	KANAMALA RANJITH KUMAR	ranjithkumar.2018.ece@anits.edu.in	29 min	1:19 PM	1:48 PM
319126512024	KANGAVA KUMAR SWAMY	kumarswamy.2019.ece@anits.edu.in	4 min	1:18 PM	1:22 PM
319126512026	KATAKAM SAI CHARAN	saicharan.2019.ece@anits.edu.in	24 sec	1:18 PM	1:18 PM
320126512L17	kirlampallimanikumar	kirlampallimanikumar.le20.ece@anits.edu.in	58 min	1:01 PM	1:59 PM
319126512155	KOLLURI DIVYA TEJA SRI	divyatejasri.2019.ece@anits.edu.in	12 min	12:58 PM	1:10 PM
319126512092	KONDAPALLI YASASWINI	yasaswini.2019.ece@anits.edu.in	59 min	1:03 PM	2:01 PM

Charan	kumar	char**********@***.com	13 sec	12:52 PM	12:52 PM
319126512157	LAGUDU DURGA PRIYANKA	durgapriyanka.2019.ece@anits.edu.in	17 sec	12:58 PM	12:59 PM
319126512160	MALLELLI CHAITANYA	chaitanya.2019.ece@anits.edu.in	6 min	1:29 PM	1:35 PM
318126512154	MALLEMOGGALA VENKATA SAIRAM	venkatasairam.2018.ece@anits.edu.in	10 min	12:58 PM	1:08 PM
320126512L05	manoharreddymedapati	manoharreddymedapati.le20.ece@anits.edu.in	26 min	1:08 PM	1:40 PM
319126512034	MEESALA KARTHEEK	kartheek.2019.ece@anits.edu.in	28 min	1:28 PM	1:56 PM
319126512162	MENDI VAMSI	vamsi.2019.ece@anits.edu.in	37 min	12:58 PM	1:35 PM
319126512098	MUSHINI SATYA SUDHA	satyasudha.2019.ece@anits.edu.in	58 min	1:03 PM	2:01 PM
319126512166	NAGIREDDY ABHINAYA	abhinaya.2019.ece@anits.edu.in	2 min	1:08 PM	1:11 PM
Murugapandiyan	P	muragapandiyan.ece@anits.edu.in	53 sec	12:47 PM	12:48 PM
Murugapandiyan	P	muru******@***.com	1 hr 13 min	12:49 PM	2:02 PM
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318126512095	PISINI PADMAJA	padmaja.2018.ece@anits.edu.in	6 min	1:06 PM	1:12 PM
Devi Pradeep	Podugu	devipradeep.ece@anits.edu.in	1 hr 3 min	12:24 PM	2:02 PM
319126512171	PUNUMAJJI DIVYA SRI	divyasri.2019.ece@anits.edu.in	54 sec	1:20 PM	1:21 PM
318126512168	PUNUMAJJI VINAY MOULI	vinaymouli.2018.ece@anits.edu.in	1 min	1:18 PM	1:20 PM
318126512093	P V S TEJA	vsteja.2018.ece@anits.edu.in	49 sec	1:21 PM	1:22 PM
VVK	Raju	vvkraju.ece@anits.edu.in	1 hr 2 min	12:59 PM	2:02 PM
Bhargav	Ram L11	tammirisisrinrusimhabhargavaram.le20.ece@anits.edu.in	1 hr 1 min	1:00 PM	2:02 PM
319126512173	RAVIKUMAR KANURI	kanuri.2019.ece@anits.edu.in	1 min	1:15 PM	1:17 PM
319126512174	REDDI HARISH	harish.2019.ece@anits.edu.in	1 hr 3 min	12:58 PM	2:02 PM
319126512176	REDDY SRINIVASA RAO	srinivasarao.2019.ece@anits.edu.in	37 sec	1:05 PM	1:26 PM
318126512045	ROOP SAI SAKTHI KUMAR VALLU	saisakthikumarvallu.2018.ece@anits.edu.in	1 hr 1 min	1:00 PM	2:02 PM

318126512096	ROUTHU AASHA	aasha.2018.ece@anits.edu.in	28 sec	1:29 PM	1:30 PM
srinivas	s	ssrinivas.ece@anits.edu.in	1 hr 7 min	12:55 PM	2:02 PM
318126512169	SABBISETTI GANESH	ganesh.2018.ece@anits.edu.in	2 min	1:06 PM	1:08 PM
319126512113	SAI JASHWANTH KUMAR GUNTU	jashwanthkumarguntu.2019.ece@anits.edu.in	1 min	1:06 PM	1:07 PM
318126512100	SANDULA SRAVAN	sravan.2018.ece@anits.edu.in	12 sec	1:11 PM	1:11 PM
318126512101	SANKU SAI NIKHIL	sainikhil.2018.ece@anits.edu.in	33 sec	1:18 PM	1:18 PM
Chandra	Sekhar	chan**********@***.com	58 min	1:04 PM	2:02 PM
319126512181	SHAIK ABDUL KAREEN	abdulkareen.2019.ece@anits.edu.in	58 min	1:02 PM	2:00 PM
318126512172	SIMMA NARENDRA	narendra.2018.ece@anits.edu.in	15 min	1:19 PM	1:34 PM
319126512056	SOMIREDDI YESWANTH	yeswanth.2019.ece@anits.edu.in	3 min	12:55 PM	1:28 PM
319126512183	TANKALA VANDANA	vandana.2019.ece@anits.edu.in	23 min	12:59 PM	1:23 PM
319126512119	THADDI JAGADEESWAR	jagadeeswar.2019.ece@anits.edu.in	10 sec	1:39 PM	1:39 PM
319126512185	VADDADI CHARAN KUMAR	charankumar.2019.ece@anits.edu.in	29 min	12:53 PM	1:22 PM
319126512124	VANGAPANDU RASHMITA	rashmita.2019.ece@anits.edu.in	13 min	1:09 PM	1:22 PM
318126512115	VANTAKULA SRAVANI	vantakulasravani.2018.ece@anits.edu.in	8 min	1:01 PM	1:10 PM
319126512186	VEESAM YUGANDHAR	yugandhar.2019.ece@anits.edu.in	24 min	12:58 PM	1:22 PM
320126512L19	yampadasureshreddy	yampadasureshreddy.le20.ece@anits.edu.in	10 min	1:51 PM	2:02 PM
318126512120	YERRA PAVAN KUMAR	yerrapavankumar.2018.ece@anits.edu.in	14 min	12:57 PM	1:11 PM