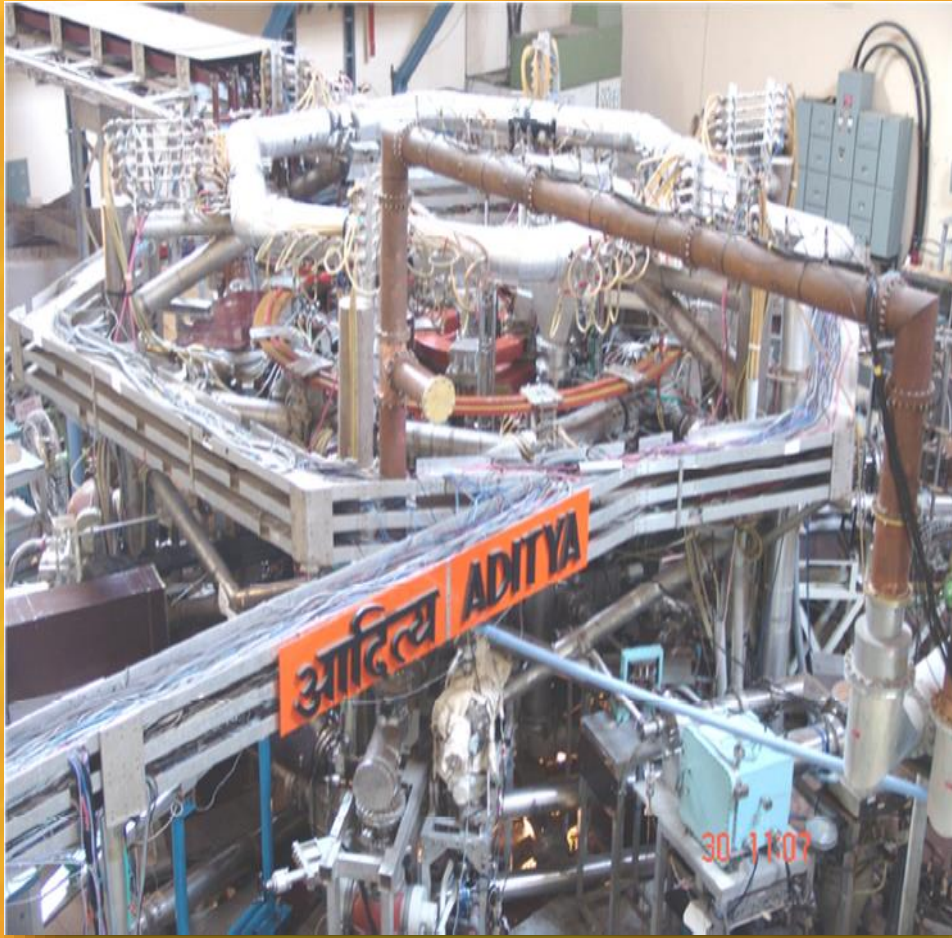


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National Symposium for Commemorating 30-years of ADITYA Tokamak



27th and 28th January 2020

Organised by:

**Institute for Plasma Research (IPR)
Bhat, Gandhinagar, Gujarat
&
Department of Atomic Energy (DAE)
Mumbai**

Venue

**Entrepreneurship Development
Institute (EDI) of India,
Gandhinagar**





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National Symposium for Commemorating 30-years of ADITYA Tokamak

Information Booklet

27th and 28th January 2020

Venue

**Entrepreneurship Development Institute (EDI) of India,
Gandhinagar**

Organised by:

**Institute for Plasma Research (IPR),
Bhat, Gandhinagar, Gujarat**

&

Department of Atomic Energy (DAE), Mumbai

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Local Organizing Committee (LOC)

Name	Position
Shishir Deshpande	Chairman
Ujjwal Kumar Baruah	Member
P K Chattopadhyay	Member
C N Gupta	Member
D Raju	Member
Vipul L Tanna	Member
S Pathak	Member
Joydeep Ghosh	Member
Amit Srivastava	Member
Manoj Gupta	Member
Ranjana Manchanda	Member
Chhaya Chavda	Member
Rakesh L Tanna	Convenor

Sub-Committees

Registration	Food	Transport & Accommodation
Raju Daniel (Chair) Kumudni Tahiliani Abha Kanik Pramila Gautam Praveena Kumari Minsha Shah	Manoj Kumar Gupta (Chair) Ranjana Manchanda Dilip C. Raval Harshad Chamunde L.N. Srikanth Ketan M. Patel	A.K. Srivastava (Chair) Hitesh T. Mehta Pankaj K. Srivastava Tanmay Macwan Hiren Nimavat Kaushlender Singh
Souvenir / Booklet	Stage & Poster preparation	Aditya-U Tokamak Visit
Chhaya Chavda (Chair) Vipul L. Tanna Amulya Kumar Sanyasi Saroj Das S. Shravan Kumar Pinakine Devluk	Joydeep Ghosh (Chair) Ramasubramanian N Chhaya Chavda Hiral B Joshi Govind Lokhande Nilam Nimavat	Chhaya Chavda(Chair) Kumarpalsinh Jadeja Kaushal Patel Rohit Kumar Suman Aich Suman Dolui
Sponsorship	Video & Photography	Financial Dealings
Vipul L. Tanna (Chair) Suryakant Gupta Ranjana Manchanda Pinakine Devluk	Chhaya Chavda (Chair) Mohandas K.K. Saroj Das S. Shravan Kumar	Rakesh L. Tanna (Chair) Ranjana Manchanda Chhaya Chavda Pinakine Devluk

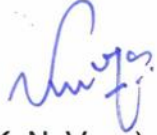
के. एन. व्यास
K. N. Vyas



अध्यक्ष, परमाणु ऊर्जा आयोग
व
सचिव, परमाणु ऊर्जा विभाग
Chairman, Atomic Energy Commission
&
Secretary, Department of Atomic Energy

MESSAGE

I am happy to learn that the indigenously built ADITYA tokamak at the Institute for Plasma Research (IPR), Gandhinagar, has completed 30 years of operation. While fusion energy is an important component of our long-term energy security, the development of Societal applications of plasmas in the near term is of equal significance. IPR has been playing a major role in both areas. I congratulate all the past and present scientists of IPR for reaching this milestone. I am sure that the Symposium will ignite the minds of researchers as well as students, fostering growth in these critical areas in our country. I extend my best wishes to the organizers and participants for success of the Symposium.


(K. N. Vyas)



अणुशक्तिभवन, छत्रपति शिवाजी महाराज मार्ग, मुंबई - 400 001, भारत • Anushakti Bhavan, Chhatrapati Shivaji Maharaj Marg, Mumbai - 400 001, India
दूरभाष/Phone: +(91) (22) 2202 2543 • फैक्स/Fax: +(91) (22) 2204 8476 / 2284 3888
ई-मेल/E-mail: chairman@dae.gov.in

डॉ. अजित कुमार मोहान्ती
Dr. Ajit Kumar Mohanty



निदेशक, भाभा परमाणु अनुसंधान केंद्र
Director, Bhabha Atomic Research Centre
सदस्य, परमाणु ऊर्जा आयोग
Member, Atomic Energy Commission



MESSAGE

I am happy to learn that the ADITYA tokamak at the Institute for Plasma Research (IPR), Gandhinagar, has completed 30 years of operation. IPR has been playing a key role in Fusion as well as Societal applications of plasma science & technology. I am sure that the tokamak programme at IPR will continue to demonstrate the deployment of indigenously-developed technologies as well as new results in the field.

I extend my best wishes to the organizers and participants for success of the Symposium.

Ajit Kumar Mohanty
(Dr. Ajit Kumar Mohanty)



भाभा परमाणु अनुसंधान केंद्र, ट्रॉम्बे, मुंबई- 400 085, भारत • Bhabha Atomic Research Centre, Trombay, Mumbai 400 085, India
दूरभाष/Phone: +(91) (22) 2550 5300, 2551 1910 • फैक्स/Fax: +(91) (22) 2559 2107, 2550 5151
ई-मेल/E-mail: ajitkm@barc.gov.in / director@barc.gov.in

DAY 1: 27.01.2020

Time Schedule	Event	Delivered by
09:00 Hrs – 09:10 Hrs	Inauguration	Lighting of Lamp
09:10 Hrs – 09:20 Hrs	Address by Director IPR	Dr. S. Chaturvedi (Director, IPR)
09:20 Hrs – 09:35 Hrs	Address by the Chief Guest	Dr. Anil Kakodkar (Former Chairman, AEC)
09:35 Hrs – 09:45 Hrs	Unveiling of Souvenir and Plasma Cartoon book	By Dr. Anil Kakodkar (Former Chairman, AEC)
09:45 Hrs – 10:05 Hrs	Key Note-1	Dr. R. Grover (Homi Bhabha Chair, DAE, HoD ITER Council)
10:05 Hrs – 10:35 Hrs	Key Note-2	Prof. A. Sen (Emeritus Professor & INSA Sr. Scientist)
10:35 Hrs – 11:00 Hrs	High Tea	
11:00 Hrs – 11:20 Hrs	ADITYA Construction & Operation	Prof. P. I. John (IPR)
11:20 Hrs – 11:40 Hrs	ADITYA Operations & Experiments	Prof. Y. C. Saxena (IPR)
11:40 Hrs – 12:00 Hrs	ADITYA – Early Diagnostics	Prof. R. Pal (SINP)
12:00 Hrs – 12:20 Hrs	ADITYA-U Diverter	Dr. R. Srinivasan (IPR)
12:20 Hrs – 12:40 Hrs	ADITYA-U: Operation & Experiments	Dr. J. Ghosh (IPR)
12:40 Hrs – 13:00 Hrs	RF experiments in ADITYA/ADITYA-U	Prof. P. K. Chattopadhyay (IPR)
13:00 Hrs – 14:15 Hrs	Lunch	
14:15 Hrs – 15:30 Hrs	Panel Discussion (Enhancing University participation in ADITYA-U experiments)	Prof. Shishir Deshpande
15:30 Hrs – 16:00 Hrs	Tea/Coffee	
16:00 Hrs – 16:20 Hrs	Magnets for Charged Particle Beams	Mr. S. Malhotra (BARC)
16:20 Hrs – 16:40 Hrs	Novel Pellet Injection Experiments	Dr. S. Pahari (BARC-Vizag)
16:40 Hrs – 17:00 Hrs	ADITYA/ADITYA-U - Pulsed Power System	Dr. Balakrishnan V Nair (IPR)
17:00 Hrs – 17:20 Hrs	ADITYA/ADITYA-U – Vacuum System	Mr. S. B. Bhatt (IPR)
17:20 Hrs – 17:40 Hrs	ADITYA Support structure & Mechanics	Mr. Bharat Doshi (IPR)
18:00 Hrs – 19:00 Hrs	ADITYA-U visit	All Participants/Guests
19:30 Hrs – 21:00 Hrs	Dinner	

DAY 2: 28.01.2020

Time Schedule (DAY 2)	Event	Delivered by
09:30 Hrs – 09:50 Hrs	On Fast Data Acquisition systems	Mrs. A. Behere (BARC)
09:50 Hrs – 10:10 Hrs	ADITYA Electronics & Data acquisition	Mr. Harshad Pujara (IPR)
10:10 Hrs – 10:30 Hrs	ADITYA – Electrical Subsystems	Mr. K. Sathyanarayana (IPR)
10:30 Hrs – 10:50 Hrs	Gyrotron Development	Dr. R. K. Sharma (CEERI Pilani)
10:50 Hrs – 11:15 Hrs	High Tea	
11:15 Hrs – 11:35 Hrs	RF physics and application	Prof. A. K. Ganguly (IIT Delhi)
11:35 Hrs – 11:55 Hrs	ADITYA-U Pre-ionization & start-up	Mr. B. K. Shukla (IPR)
11:55 Hrs – 12:15 Hrs	ICR Heating	Dr. S. V. Kulkarni (IPR)
12:15 Hrs – 12:35 Hrs	LH Current Drive	Dr. Pramod Sharma (IPR)
12:35 Hrs – 12:55 Hrs	Freq. modulated Reflectometer	Dr. A. Amalin Prince (BITS-Pilani, Goa)
13:00 Hrs – 14:15 Hrs	Lunch	
14:15 Hrs – 14:35 Hrs	ADITYA – Modelling Studies	Dr. Indranil Bandyopadhyay (IPR)
14:35 Hrs – 14:55 Hrs	Impurity Gas Injection Studies	Dr. Nirmal Bisai (IPR)
14:55 Hrs – 15:15 Hrs	ADITYA Diagnostics progress	Dr. CVS Rao (IPR)
15:15 Hrs – 17:30 Hrs	Tea/Coffee break (in parallel with poster session)	
	Poster Session	
	Concluding Session	
17:30 Hrs – 17:45 Hrs	Conclusion/vote of thanks	Mr. R. L. Tanna (IPR)

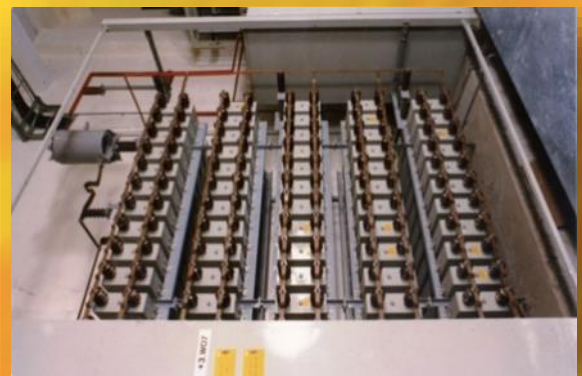
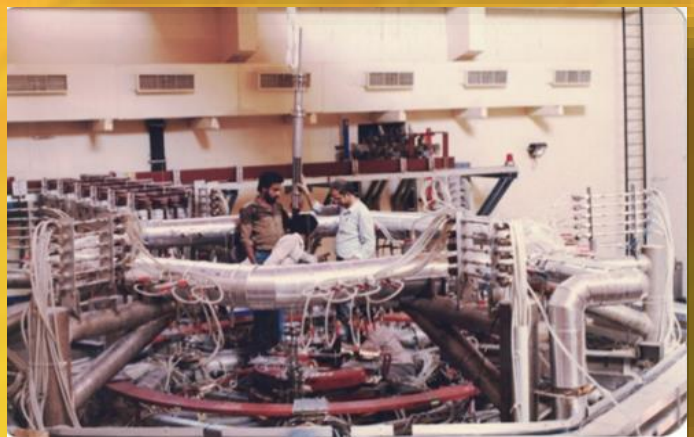
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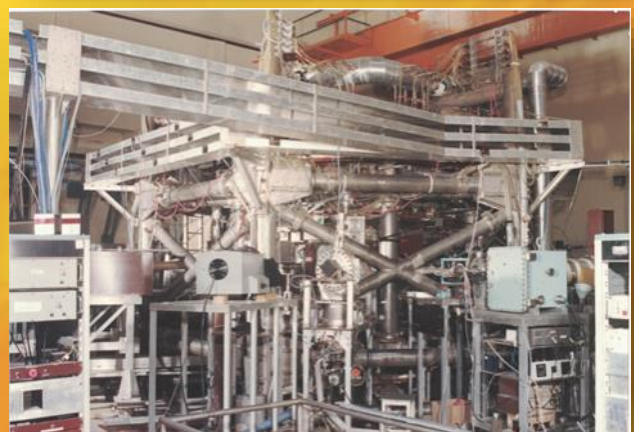
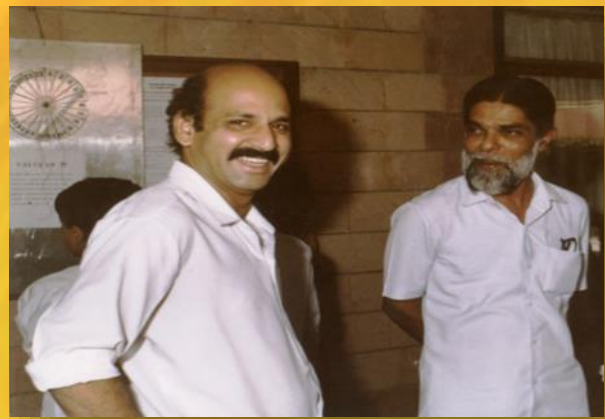
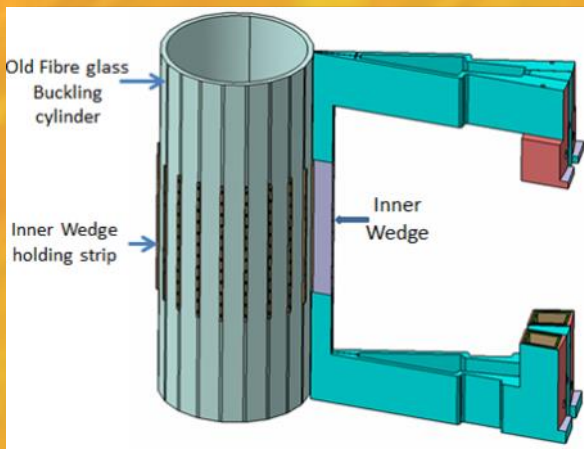
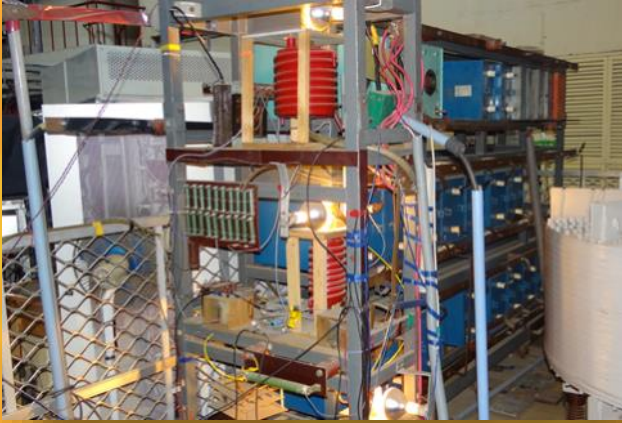
Initial Civil Erection and Building infrastructure Activities in 1986



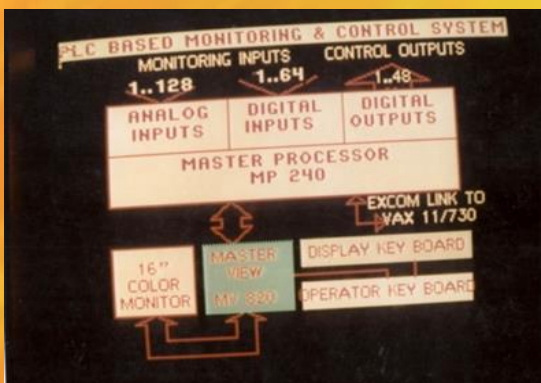
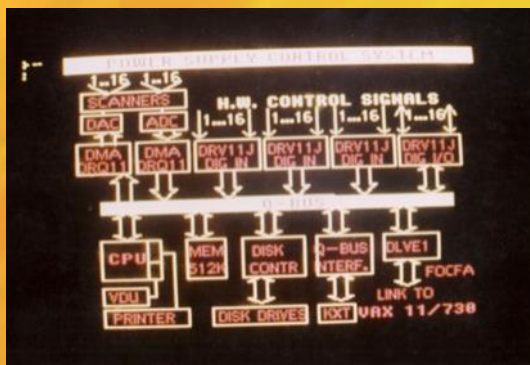
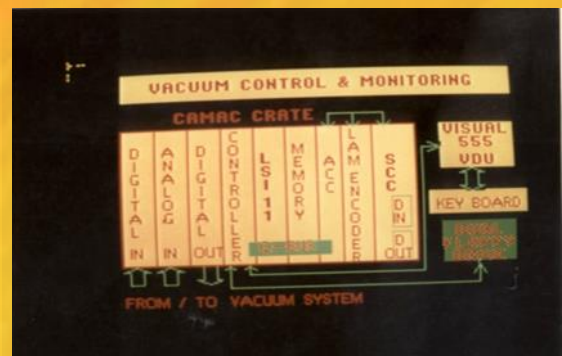
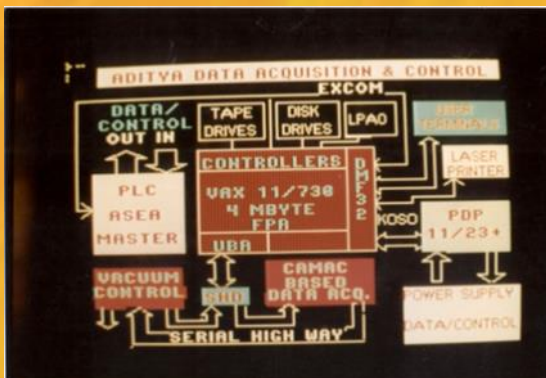
ADITYA & APPS Power Station and ADITYA Tokamak Assembly



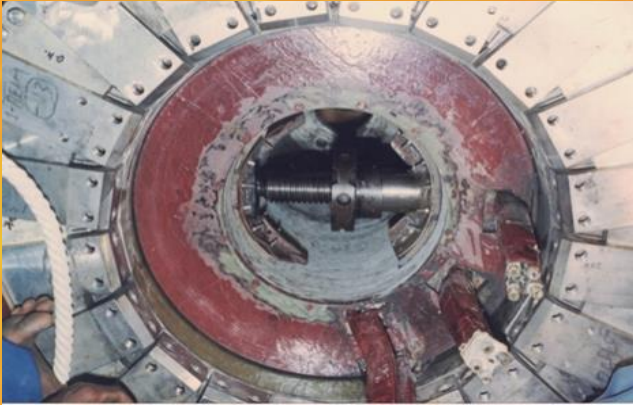
ADITYA Tokamak, Capacitor bank and Diagnostic Systems



ADITYA Tokamak Data Acquisition and Control System



Removal of Central Solenoid (TR1) Coil (1997)



Important Results from ADITYA Tokamak

30000 APPS
DISCHARGES

**HIGHLY SUCCESSFUL
OPERATION**

8000 CB
DISCHARGES

Publications
~ 150

Publications in
Conferences /
Symposium
~ 700

Research Reports
~ 75

PhDs
10



“BURSTY” nature of plasma transport in Tokamaks has been shown for the first time to the world in ADITYA

Confirmed Worldwide Later

(Physical Review Letters, Volume 69, Number 9, 1992)

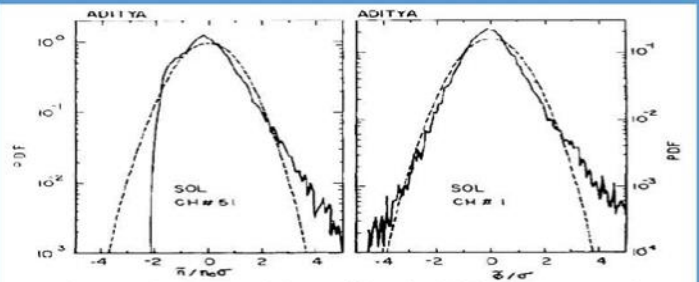
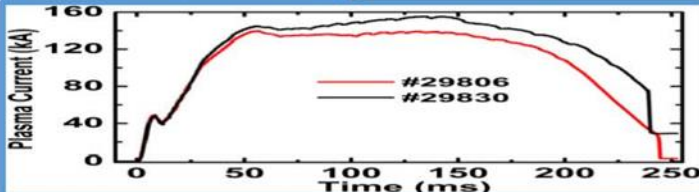
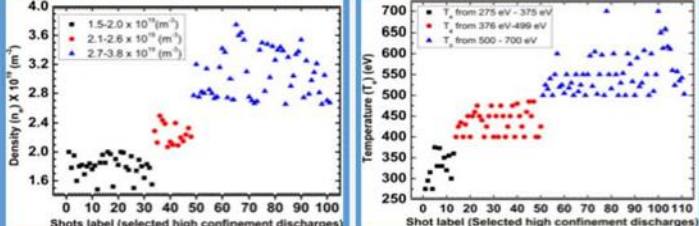
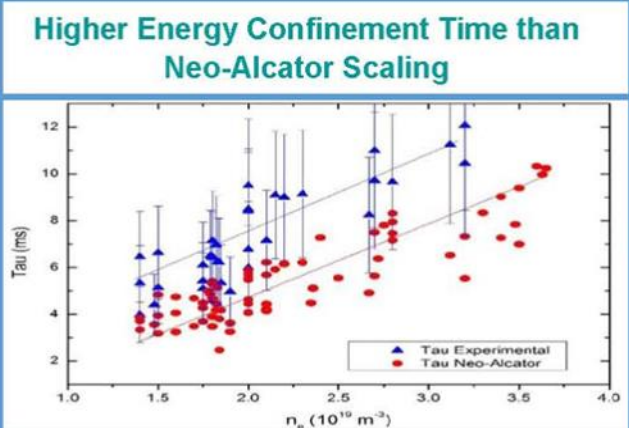
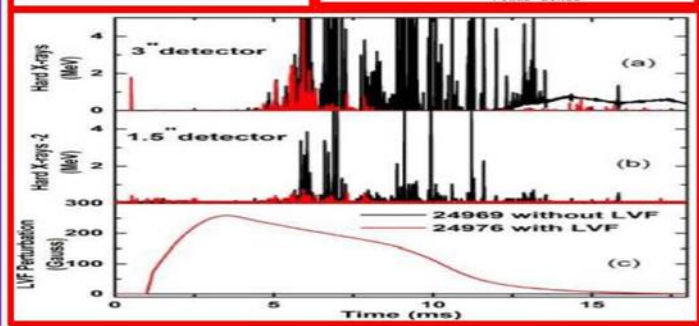
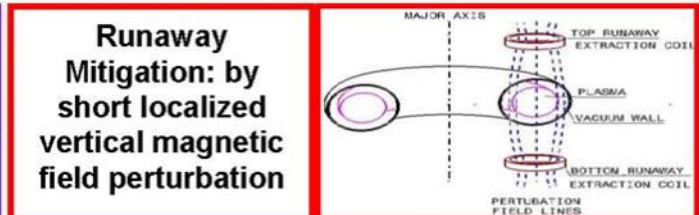
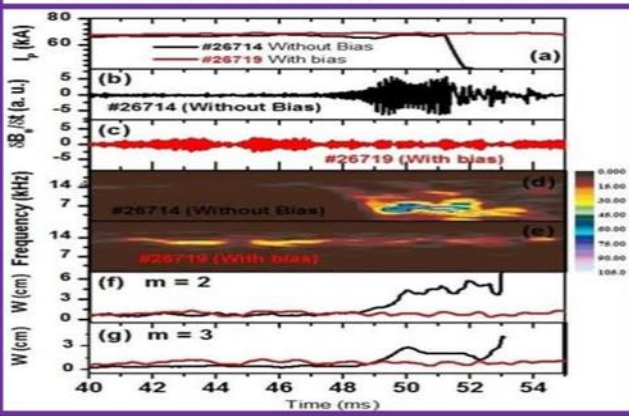


FIG. 3. The PDFs of \tilde{n} and $\tilde{\phi}$ in the SOL plasma as a function of fluctuation amplitude normalized to the respective standard deviation (σ). The dashed curves represent Gaussians with the same σ .



Nuclear Fusion 57 (2017) 102008

MHD generated disruptions in Aditya are successfully mitigated with sheared rotation induced by biased electrode



Nuclear Fusion 55 (2015) 063010

ADITYA Upgrade Tokamak

The Aim:

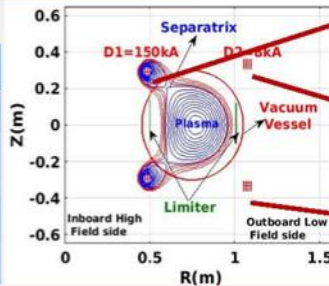
- ✓ A small/mid-size tokamak with Divertor Configuration (single & double null)
- ✓ To carry out experiments relevant for large size Machines (runaways, disruption etc.)
- ✓ Easier access and Smaller duty cycle

Divertor coil locations identified using plasma equilibrium reconstruction code IPREQ

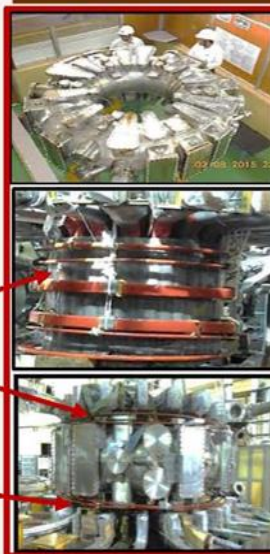
Divertor coils

ADITYA Upgrade Parameters:

Major radius (R)	0.75 m
Minor radius (a)	0.25 m
Plasma Shape	Circular / Shaped
Toroidal Field	1.5 T
Plasma Current	150 - 250 kA



New circular shape vacuum vessel



ADITYA Dis-assembly started-April,15



ADITYA operated for 25 Years

Dis-assembly completed - June, 15



ADITYA dismantled

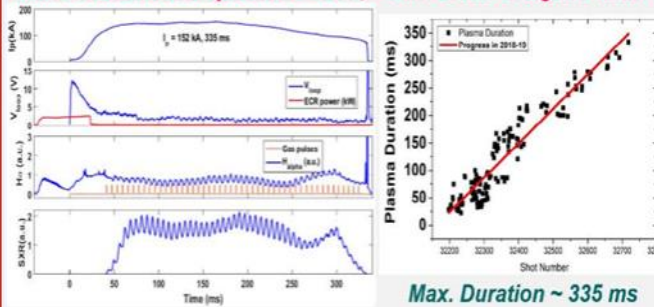
ADITYA-U assembly completed-Mar.,16



ADITYA-U operation started - Dec.16

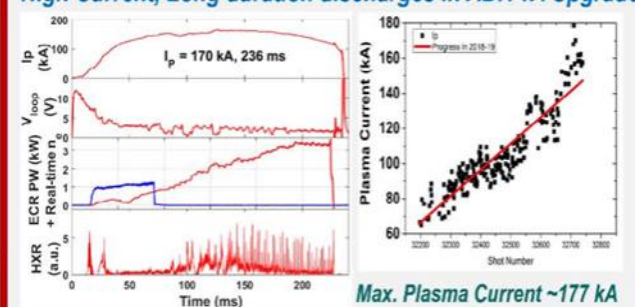
Important Results from ADITYA Upgrade Tokamak

Max. Toroidal Field operated ~ 1.4 T, ~ 93% of the designed value



Max. Duration ~ 335 ms

High Current, Long duration discharges in ADITYA Upgrade



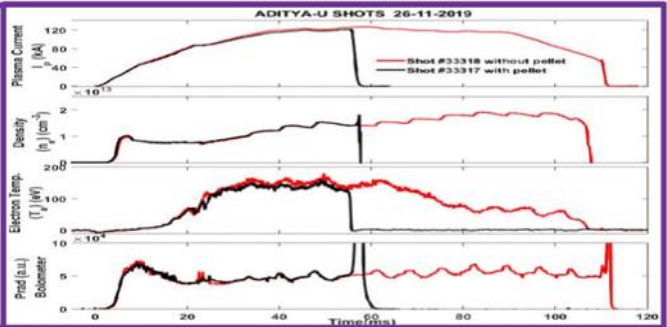
Max. Plasma Current ~177 kA

Nuclear Fusion 59 (2019) 112006

Electromagnetic Pellet Injector (Li_2TiO_3) Experiment in ADITYA-U

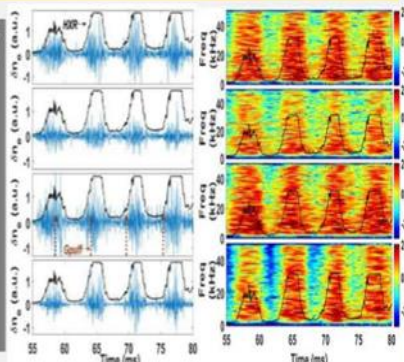
First time an electromagnetic pellet injector used to fire the pellets into the tokamak

Significant development towards ITER disruption control

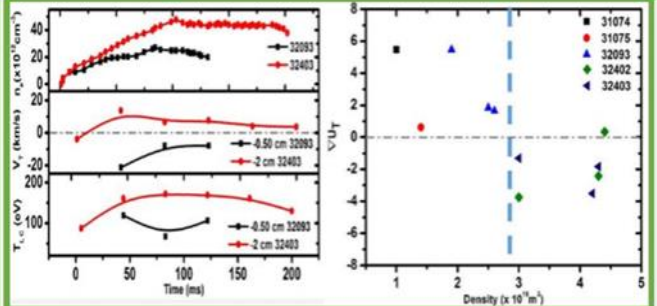


TURBULENT FLUCTUATIONS INDUCED RUNAWAY ELECTRON LOSS

Significant Suppression of Runaway Electron Loss by Suppression of Edge Density and Potential Fluctuations using Periodic Gas puffs

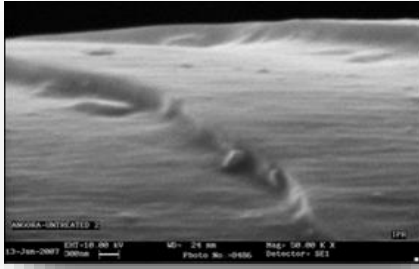


Plasma Toroidal Rotation Reversal

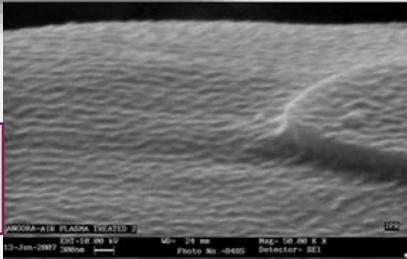


Nuclear Fusion 59 (2019) 106049

Societal Application of Plasma Technology



Untreated Angora Fibre



Plasma Treated Angora Fibre



Specifications
 Input Material: Angora Web
 Width: 1m
 Speed: 4.5 m/min
 Gas Ambient Air

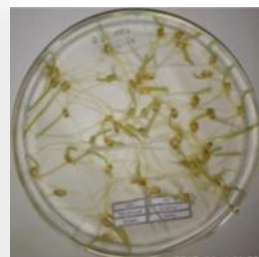
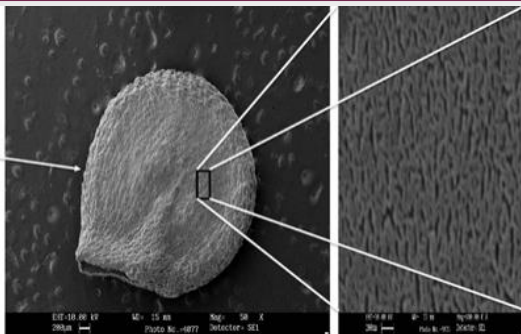
Plasma Textile Applications



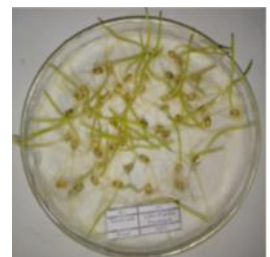
Plasma Pyrolysis System



Plasma Jet for Medical Applications



Untreated Wheat seeds



Plasma treated Wheat seeds

Plasma for Agriculture Applications

List of Abstracts - NSC30AT2019

Design, Fabrication And Installation Of Support Structure For Reflectometry Diagnostics on Aditya-U Tokamak
Pratibha Gupta, Manoj Kumar Gupta, Bharat Doshi, J.J.U.Buch, S.K.Pathak*

Charge Exchange Neutral Particle Analyzer (CX-NPA) diagnostic measurements in ohmic as well as Ion cyclotron resonance heated plasma discharges in Aditya
Snehlata Aggarwal Santosh Pandya and Kumar Ajay*

Comparative study of perpendicular and tangential viewing Soft X-ray tomographic reconstruction for Aditya tokamak MHD Equilibrium and Stability
Shishir Purohit and Manoj Kumar Gupta

Field simulation of Ohmic Ramp down in ADITYA – Need for Correction Coils for improvement of Magnetic Null
Amardas Alli

ADITYA Vacuum Monitoring and Control System
Kiran Patel, K.A. Jadeja, Kaushal Patel, H.C. Joshi & Joydeep Ghosh

Whistlers: A Probable Mechanism to Mitigate Runaway Electrons in Tokamaks
A. K. Sanyasi, Prabhakar Srivastav, L. M. Awasthi, P. K. Srivastava, R. Sugandhi and D. Sharma

Effect of Superthermal Electrons on Ion-Acoustic Wave in Negative Ion Plasmas
J. K. Chawla

Effect of Superthermal Electrons and Positrons on Ion-Acoustic Double Layers in Magnetized Plasmas
P. C. Singhadiya and J. K. Chawla*

Plasma Position Estimation Using Magnetic Diagnostics in ADITYA-U
S. Aich, R. Kumar, T. M. Macwan, D. Kumavat, S. Jha, R. L. Tanna, Sathyanarayana K., J. Ghosh, K. A. Jadeja, K. Patel, Sharvil Patel, Vaibhav Ranjan, Madanlal Kalal, Dinesh Varia, D. Sadharkiya, D. Raju, P. K. Chattopadhyay, C. N. Gupta, Y. C. Saxena and ADITYA-U team*

Iron Impurity Behaviour Study in the ADITYA Tokamak
A. K. Srivastava, S. Patel, M. B. Chowdhuri, R. Manchanda, J. V. Raval, U. Nagora, P.K. Atrey, R. L. Tanna, J. Ghosh and ADITYA Team

3D simulation in Aditya Scrape-off layer using steady state model EMC3- EIRENE
Bibhu Prasad Sahoo, Devendra Sharma and Ratneshwar Jha

Tungsten Coating Deposition on Graphite and Process Optimization
P A Rayjada, K. A. Jadeja, N. L. Chauhan, S. B. Bhatt

Analytical Model for Erosion Driven Carbon Sources in Tokamaks
P. N. Maya and S. P. Deshpande

Infrared Imaging Video Bolometer diagnostics in Aditya tokamak
Santosh P. Pandya, Shwetang N. Pandya, Kumudni Tahiliani, S. K. Pathak and Aditya team

Investigation of Impurity Seeded ADITYA & ADITYA-U Tokamaks Plasmas
M. B. Chowdhuri, J. Ghosh, R. L. Tanna, K. A. Jadeja, K. M. Patel, R. Manchanda, N. Yadava, S. Patel, G. Shukla, K. Shah, R. Dey, N. Ramaiya, Tanmay Makwan, U. C. Nagora, S. K. Pathak, J. V. Raval, S. Purohit, M. K. Gupta, S. K. Jha, M. V. Gopalakrishna, K. Tahiliani, Rohit kumar, Suman Aich, Suman Dolui, Kaushlender Singh, P. K. Atrey, B. V. Nair, C. N. Gupta, P. K. Chattopadhyay, ADITYA Team and ADITYA-U Team

Investigation of atomic and molecular processes in ADITYA and ADITYA-U tokamak plasmas
Ritu Dey, J. Ghosh, M. B. Chowdhuri, Ranjana Manchanda, Nandini Yadava, R.L.Tanna, Santanu Banerjee, P. Vasu, Vinay Kumar and Aditya Team

Population-Alignment Collisional-Radiative Model for Polarization in Lyman- α Line
Nilam Ramaiya and Motoshi Goto

Electronics for Langmuir Probe in Aditya-U for the measurement in the SOL layer.

Pramila, Tanmoy, Harshita, Lavkesh, Shwetang, Rachana Rajpal

Role of Poloidal Flows on the Particle Confinement in a Current-less Toroidal Device

Umesh Kumar, R. Ganesh, K. Sathyanarayana, Y. C. Saxena and D. Raju

Investigation of Neutral Recycling and Ion Temperature of Various Plasma Species in ADITYA and ADITYA-U Tokamak

Nandini Yadava, J. Ghosh, M. B. Chowdhuri, R. Manchanda, Sripathi Punchithaya K, Ismyil, Ritu Dey, Tanmay Macwan, S. Patel, N. Ramaiya, K. A. Jadeja, R. L. Tanna and Aditya-U

Study Small Amplitude Ion-Acoustic Solitons in Negative Ion Plasmas with Superthermal Electrons

P. C. Singhadiya

Topology Optimization of a Planetary Gearbox for Fusion RH Application

Ratna .A. Rajgor, Manoah Stephen M, Krishan Kumar Gotewal, Hitesh .K. Patel

Passive Charge eXchange (PCX) Spectroscopy to Measure Plasma Rotation on Aditya-U Tokamak

G Shukla, K Shah, M.B.Chowdhuri, R Manchanda, R.L. Tanna, K.A. Jadeja, K.B.K. Mayya, J Ghosh and Aditya-U team

Characterization of Ohmic Breakdown Phase for the ADITYA discharges

Sharvil Patel, Joydeep Ghosh, R. L. Tanna, P.K. Chattopadhyay, Harshita Raj, M. B. Chowdhuri, Ranjana Manchanda, Nilam Ramaiya, Umesh Nagora, P. K. Atrey and Aditya Team

An Estimation Of The Edge Impurity Transport In The ADITYA Tokamak Through Comparison Between The Simulated and Analytical (Model-Based) Edge Impurity Diffusion Coefficients

Amrita Bhattacharya, Joydeep Ghosh, Malay Bikas Chowdhuri, Prabhat Munshi and the ADITYA team*

ECRH Power Supply System for Aditya Tokamak\

Mahesh Kushwah, B K Shukla, KG Parmar, Jatin Patel, Harshita Patel, Dharmesh Purohit and Hardik Mistry

Indigenously Developed Data Acquisition System For Plasma Diagnostics In Aditya-U Tokamak

Praveena kumari Shukla, Vismaysinh Raulji, Hitesh Mandaliya, Rachana Rajpal, Pramila, Praveenlal E.V, C.J Hansalia

Gas Puff Induced Drift Waves In ADITYA And ADITYA-U Tokamak

Tanmay Macwan, Harshita Raj, Kaushlender Singh, Suman Dolui J. Ghosh, R. L. Tanna, Rohit Kumar, Suman Aich, Lavkesh Lachhvani, Pramila Gautam, K. A. Jadeja, K. M. Patel, N C Patel, V Panchal, Umesh Nagora, P. K. Atrey, S. K. Jha, D. Raju and ADITYA-U Team

Laser Heated Emissive Probes Diagnostic in ADITYA – U TOKAMAK

Abha Kanik, Arun Sarma, Joydeep Ghosh, Tanmay Macwan, R. L. Tanna, Minsha Shah, Ranjana Manchanda, Payal Pandit, Shwetang Pandya, Jayesh Raval, Umesh Nagora and ADITYA-U Team

ADITYA Upgrade New Circular Shaped Torus Vacuum Vessel and Pumping System

K. A. Jadeja, S. B. Bhatt, K. M. Patel, J. Ghosh, V. R. Prajapati, Kulav Rathod, K. S. Acharya, Kiran Patel, B. G. Arambhadiya, R. L. Tanna, M. B. Kalal, D.S. Varia, D.H. Sadhrakiya, P. K. Chattopadhyay, Y. C. Saxena, A.Das, D. Bora

Control System Development for LIGO outgassing setup

S.Sunil, Faiz Mohammed Masi, Sabbir Ahmed, Gaurav Kumar Singh and Subroto Mukherji

Water Cooling System of ADITYA Tokamak

Yagneshkumar Trivedi, M. Vasani, S. K. Sharma, K. Padia and J.M. Gandhi

The Refurbishment of Damaged Toroidal Magnetic Field coils for ADITYA-U

D.H. Sadharakiya, R.L. Tanna, J. Ghosh, B.R. Doshi, P.K. Chattopadhyay, Sharvil Patel, Vaibhav Ranjan, Rohit Kumar, Harshita Raj, K. Sathyanarayana, M.B. Kalal, D.S. Varia, Ram Krushna Panchal, Kulav Rathod, S.B. Bhatt, A.Vardharajulu, Y. C. Saxena, and Shell-N-Tube Team

Study of Argon Line Emissions in ADITYA-U Tokamak using Spectroscopic Diagnostic

K. Shah¹, M. B. Chowdhuri², G. Shukla¹, R. Manchanda², K. A. Jadeja², N. Yadava³, N. Ramaiya¹, K. M. Patel², R. L. Tanna², K. B. K. Mayya¹, J. Ghosh² and ADITYA-U² team

Real-time Horizontal Plasma Position Control in ADITYA –U

Rohit Kumar, Pramila Gautam, Shivam Gupta, Tanmay Macwan, Praveen Lal E.V., Minsha Shah, Ranjana Manchanda, M. B. Chowdhuri, Nandini Yadav, Kunal Shah, M. N. Makwana, V. Balakrishnan, C. N. Gupta, R. L. Tanna, Suman Aich, Devilal Kumawat, K. Sathyanarayana, S. Jha, D. Raju, Joydeep Ghosh, P. K. Chattopadhyay, Y. C. Saxena and the ADITYA –U Team.

Large amplitude ion acoustic Solitons in warm negative ion plasmas with Maxwellians electrons.
Kishan Kumar and M. K. Mishra

Preliminary Study of Supersonic Molecular Beam Injection In ADITYA-U Tokamak.
Kaushlender Singh, Suman Dolui, Tanmay Macwan, K A Jadeja, K M Patel, Harshita Raj, Suman Aich, Rohit Kumar, B Arambhadiya, Siju George, Y Pravastu, D C Raval, V K Panchal, Jayesh Raval, D. Raju, S.K. Jha, R L Tanna, J Ghosh and ADITYA-U Team

Experimental Investigation on Electron Temperature Gradient Driven Instability in the Curvature Magnetic Field of MPD
A. D.Patel, Meenakshee sharma, N.Ramasubramanian, Lavkesh Lachhvani, Y. C. Saxena, R. Ganesh, P. K. Chatopadhaya

Spectroscopic Diagnostic for Magnetic Field in Tokamak Plasma
Subir Biswas

Study of ADITYA-U Tokamak Plasma using Fast Imaging Camera
Devilal Kumawat^{1}, Kumudni Tahiliani, Sameer Kumar, Gopalakrishna M V, Santosh Pandya, S.K Pathak and ADITYA-U Team*

Design And Development of Different Analog And Digital Electronic Circuits For ADITYA Tokamak
Minsha Shah, Praveenlal E.V., Hitesh Mandaliya, Vismay Raulji, C J Hansalia, Rachana Rajpal and Electronics Group, R L Tanna, J Ghosh and Aditya team*

Homodyne and Heterodyne Microwave Interferometer Systems for ADITYA Tokamak
Umesh Nagora, S.K.Pathak, P.K.Atreya and Aditya Team

Non-linear Time Series Analysis of ADITYA-U Plasma discharges
Balamurali Krishna, Mayya Kolake, Sharvil Patel, Tanmay Macwan, M.B. Choudhury, R. Manchanda, J. Ghosh, and Sameer Kumar

Investigations of Plasma Disruption Prediction in Tokamak using Machine Learning Tools
Yogesh Meghrajani, Himanshu Mazumdar, Indranil Bandyopadhyay, Satvik patel, Jignasa Patel and Aditya Team

X-Ray Diagnostics Systems in ADITYA/ADITYA-U Tokamak
Jayesh Raval, S. Purohit, M. K. Gupta, Y.S. Joisa, Praveena kumari, Minsha Shah, Vishmay Raulji, Imran Mansuri, Manisha Bhandarkar, K. A. Jadeja, K. M. Patel, V.K.Panchal, R.L. Tanna, J. Ghose, R. Rajpal, K.Mahajan, Aditya Team

Self inductance of finite straight wire using Biot-Savart's law
Ashvin Mali

Self-Inductance of Circular Loop using Biot-Savart's Law
Deenganesh Mali

Design of Interlock Systems For Real Time Control Of Plasma Events And Experiments In Aditya Tokamak
Praveenlal Edappalli, Minsha Shah, Rachana Rajpal, K.A. Jadeja, Rohit Kumar, Suman Aich, Tanmay Macwan, K.M. Patel, R. L. Tanna, J. Ghosh and Aditya Team

Limiter and Divertor of ADITYA-U tokamak
K. M. Patel, K. A. Jadeja, J. Ghosh, R. L. Tanna, S. B. Bhatt, Deepti Sharma, R. Shrinivasan, Y. C. Saxena, Rohit Kumar, Suman Aich, Tanmay Macwan, Kaushlender Singh, Suman Dolui and ADITYA-U Team

Forecasting of Disruption in ADITYA-U Tokamak
Suman Dolui, Kaushlender Singh, Tanmay Macwan, Harshita Raj, Suman Aich, Rohit Kumar, K A Jadeja, K M Patel, V K Panchal, D. Raju, Jayesh Raval, S.K. Jha, R L Tanna, J. Ghosh and ADITYA-U Team

Recent advances and Upgradation of ICRH System on ADITYA-U
*Kishore Mishra, Atul Varia, H. M. Jadhav, Sunil Kumar, and ICRH Team**

Mechanical Design of a Pressurized Variable Pre-matching Stub for ICRH System on ADITYA-U
*Atul Varia, Kishore Mishra, Sunil Kumar, and ICRH Team**

Ph.D. Thesis contributed from ADITYA Tokamak

Sr. No.	Name of Doctoral Students / Title of Thesis
1	JOSEPH, BIJU K./Electrostatic Turbulence in Toroidal Plasma (2001)
2	RAJU, D./Study of Plasma Equilibrium and MHD Instability In ADITYA Tokamak (2002)
3	PANDYA, HITESH KUMAR/Studies on Electron Cyclotron Emission from Fusion Plasma (2008)
4	DEEPAK SANGWAN/Studies of Plasma Flows in Scrape-Off Layer Plasma of Aditya Tokamak (2013)
5	PRAVESH DHYANI/Biased Electrode Experiments in Aditya Tokamak (2014)
6	BIBHU PRASAD SAHOO / 3D Simulations and Analysis of Plasma Transport in the Scrape-Off Layer of Tokamak Aditya (2017)
7	PRAVEEN KUMAR ATREY / Design and Development of Microwave Interferometer and Reflectometer Systems for Plasma Diagnostics in Tokamak (2019)
8	HARSITA, RAJ / Study of Generation and Transport of Runaway Electrons In Aditya And Aditya-U Tokamak (Thesis submitted)
9	AMRITA BHATTACHARYA / A novel approach towards solution of the radial impurity transport equation in tokamak plasma with a semi-implicit numerical method and an estimation of impurity transport in the Aditya tokamak (Thesis Submitted)
10	TANMAY MECWAN/ Turbulence and Transport Study in ADITYA-U Tokamak (In Process)
11	GAURAV SHUKLA / Study of Plasma Rotation on ADITYA-U tokamak (In progress)
11	KAJAL SHAH / Plasma Rotation and Impurity Transport Study in X-ray Crystal Spectroscopy. (In Process)
12	SAPNA MISHRA / The study of impurities transport in tokamak plasma using Spectroscopic diagnostic (In process)
13	ABHA KANIK / Direct measurement of plasma potential and its fluctuations by Laser Heated Emissive Probes in ADITYA tokamak (In process)
14	KUMARPALSINH JADEJA / Synthesis and Studies on Some Surface Conditioning Materials and Techniques for Tokamak and Laboratory Vacuum Systems (In process)
15	SHARVIL PATEL / Study of impurity transport in the ADITYA-U tokamak (In process)
16	SUMAN DOLUI / Forecasting of Disruptions in ADITYA-U Tokamak (In Process)
17	KAUSHLENDER SINGH / Effect of Super Sonic Molecular Beam Injection in ADITYA-U Tokamak (In process)
18	VARSHA SIJU / Study of electron dynamics in tokamak plasma through EC emission using Radiometer (In Process)
19	UMESH NAGORA / Study of transport and turbulence in tokamak plasma using microwave Interferometer system (In Process)
20	KIRAN PATEL / FPGA based Signal Processing Techniques for Interferometer System (In Process)
21	JANMEJAY BUCH / Experimental and theoretical/computational studies in density and temperature fluctuations of Edge/SOL region of tokamaks (In Process)

List of ADITYA Publications (1989-2019)

"Investigation of the behavior of effective charge of Aditya tokamak Plasmas", M.B. Chowdhuri, R. Manchanda, J. Ghosh, K.A. Jadeja, K.M. Patel, Vinay Kumar, Ketan Patel, P.K. Atrey, Y.S. Joisa, S.B. Bhatt, R.L. Tanna, accepted for publication in - **Plasma Phys. Control Fusion**

"Effect of periodic gas-puffs on drift-tearing modes in ADITYA/ADITYA-U Tokamak discharges", Harshita Raj, T. Macwan, Kaushlender Singh, Suman Dolui, J. Ghosh, N.K. Bisai, K.A. Jadeja, K.M. Patel, N.C. Patel, R. L. Tanna, D. Raju, S.K. Jha, P.K. Chattopadhyay, A. Sen, R. Pal, and ADITYA-U Team, **accepted for publication in – Nuclear Fusion**

"Electrical Model of ADITYA-U Tokamak", Devilal Kumawat, Rohit Kumar, J. Ghosh, R.L Tanna, Accepted for publication in **Indian Journal of Physics**.

"The data acquisition and control system for the operation of ASDEX pressure gauge for the measurement of neutral pressure in ADITYA Tokamak", Kiran Patel, K.A. Jadeja, H.C. Joshi, J. Ghosh, **Fusion Engineering & Design, Vol. 148 (November-2019) 111256** DOI: <https://doi.org/10.1016/j.fusengdes.2019.111256>

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"Evaluation of an Oxygen Transport Coefficient in the Aditya Tokamak Using the Radial Profile of O4+ Emissivity and the Importance of Atomic Data Used Therein", M.B. Chowdhuri, J. Ghosh, Ritu Dey, Sharvil Patel, Nandini Yadava, Ranjana Manchanda, Amrita Bhattacharya, Izumi Murakami and Aditya Team, **Atoms 2019, 7(3), 90** DOI: <https://doi.org/10.3390/atoms7030090>

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Industry support for ADITYA

Subsystems/ Components	Fabrication By
UHV Vacuum Vessel	M/S Larsen & Toubro, Mumbai
TF Coil Machining	M/S Lakshmi Vijay Brass & Iron Works, Ahmedabad
TF Coil Insulation & Consolidation; Poloidal coils	Coils & Insulation Division M/S Bharat Heavy Electrical Limited, Bhopal
Supporting Structure	M/S Godrej Industries, Mumbai
Buckling Cylinder	M/S Dakle, Vapi
Water Cooling System	M/S Blue Star, Ahmedabad
132 kV Sub-station	M/S Asia Brown Boveri M/S Siemens
Aditya Pulse Power System	M/S NGEF, Bangalore, in collaboration with M/S AEG, Germany
Bus Bars	M/S Hindustan Brown Boveri, Vadodara
Capacitor Banks	In-house
TF DC power Supply	M/S Electrotherm, Ahmedabad
ADACS	In-house
PLC	M/S Asia Brown Boveri
Pumping system, Vacuum Seals, Gas feed system etc.	In-house
Pumping Ducts	Variety Engineers, Vadodara
Plasma Diagnostics	In-house
Assembly (Aditya Machine)	M/S Teknow Consultants & Engineers Pvt. Ltd., New Delhi under supervision of IPR
Dis-Assembly and Re-Assembly (Aditya-U Machine)	Shell-N-Tube, Pune
UHV Vacuum Vessel (Aditya-U)	M/S Godrej Industries, Mumbai
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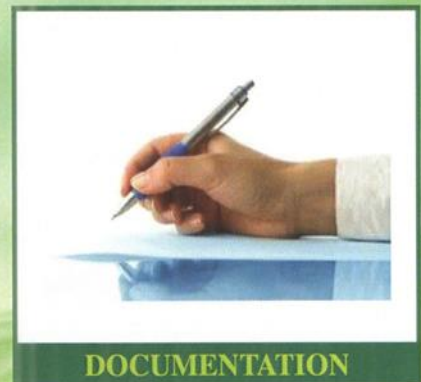
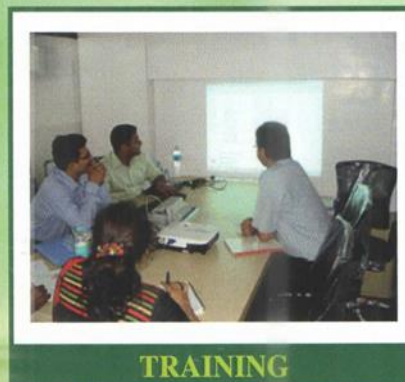
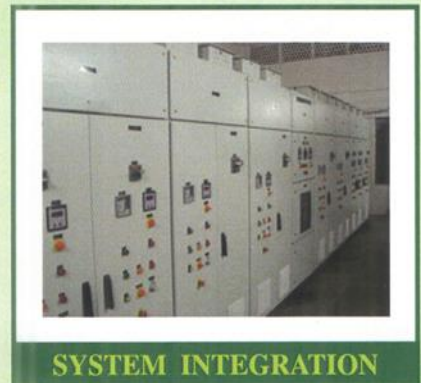
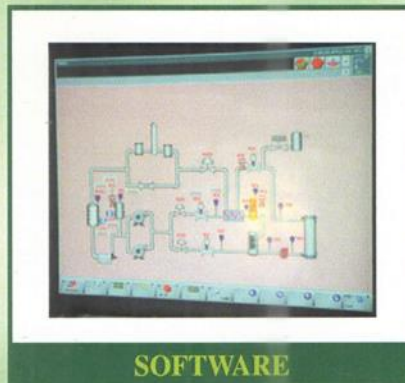
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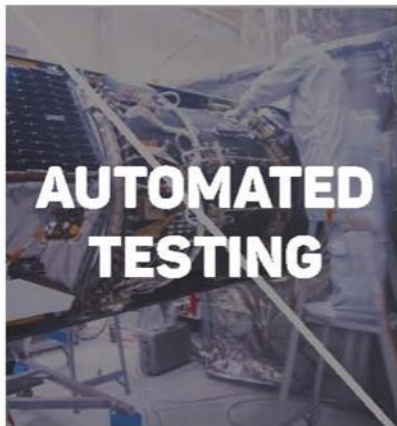
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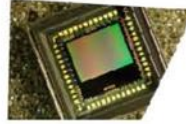
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