

SNEAP-2012

S. CHOPRA

Inter University Accelerator Centre

New Delhi , INDIA

ION ACCELATORS AT IUAC,NEW DELHI
BREAKDOWNS, UP GRADATION AND TROUBLE SHOOTINGS

S Chopra, D Kanjilal, P.Kumar, S Ojha, S Gargari and R Joshi





Inter University Accelerator Centre has two tandem ion accelerators

- **15UD 16 MV Pelletron**

Operational since last 20 years

- **5SDH-2 1.7MV Pelletron**

Operational since last week of Dec. 2010.

- Received from University of Maryland for RBS and Channelling studies .



[illegible]

WE HOPE TO RECEIVE THE COMPLETE SYSTEM IN THE YEAR 2013.

OVERALL PELLETRON PERFORMANCE

UPTIME ~ 98%
BEAM TIME UTILIZATION ~ 60%
TANK OPENINGS : 2

Maximum TP at which beam was delivered : 14.2 MV

Minimum TP at which beam was delivered : 3.5 MV

CHAIN NO.1 ~ 1,34,000 HOURS

CHAIN No.2 ~ 1,01,000 HOURS

OPERATIONAL SUMMARY

Chain Hours	=	6741 Hours
Total Beam utilization	=	4040 Hours
Machine breakdown	=	109 Hours
Accelerator Conditioning	=	421 Hours
Scheduled Maintenance	=	1888 Hrs.

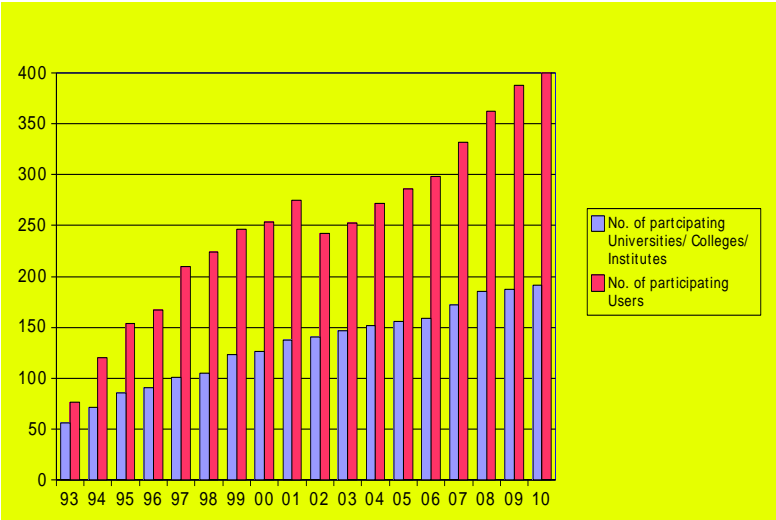
SNEAP 2011: Oak Ridge

- Uptime of 97% and beam time utilization factor is above 60%.
- Providing beams to around 400 users

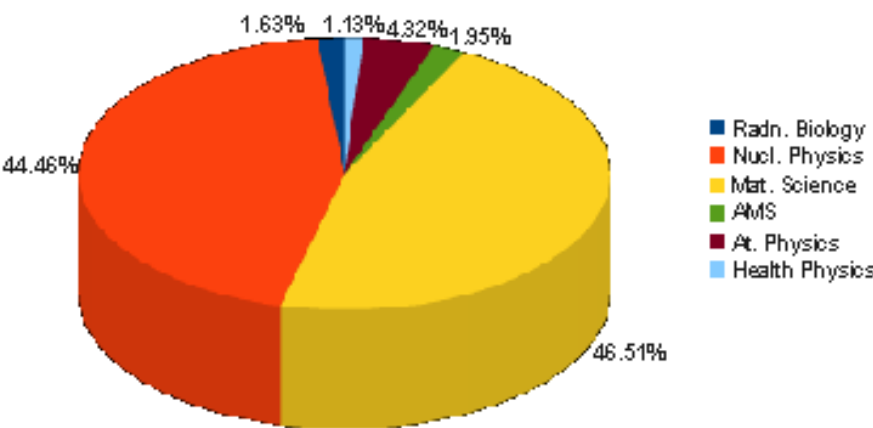
CHAIN NO.1 ~ 1,30,000 HOURS
CHAIN No.2 ~ 1,01,000 HOURS

Beam energy augmentation is in process, using LINAC .

WE PLAN TO OPEN TANK ONCE A YEAR.



Research Facility Utilization



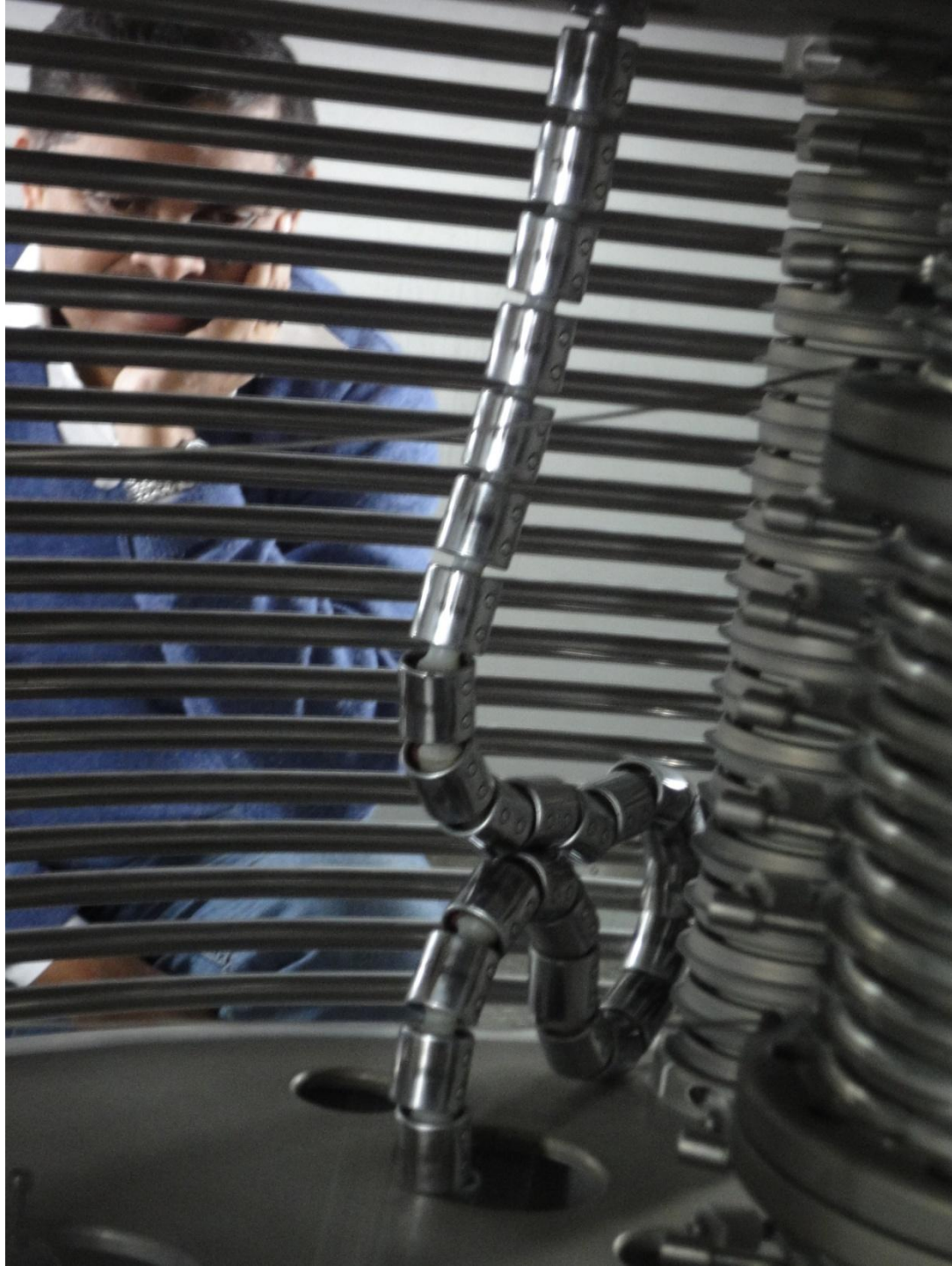
SNEAP 2012

After tank opening December 2010 maintenance beam delivered to users was from 10th February 2011 to 27th December 2011.

Charging system #1 breakdown on 28th December 2011.

No charging current in charging chain #1 with chain motor #1 ON.

Confirmed the breaking of chain #1 by visual inspection.







Unit #20 Lower Casting





RPE
2m

27

27

23

23







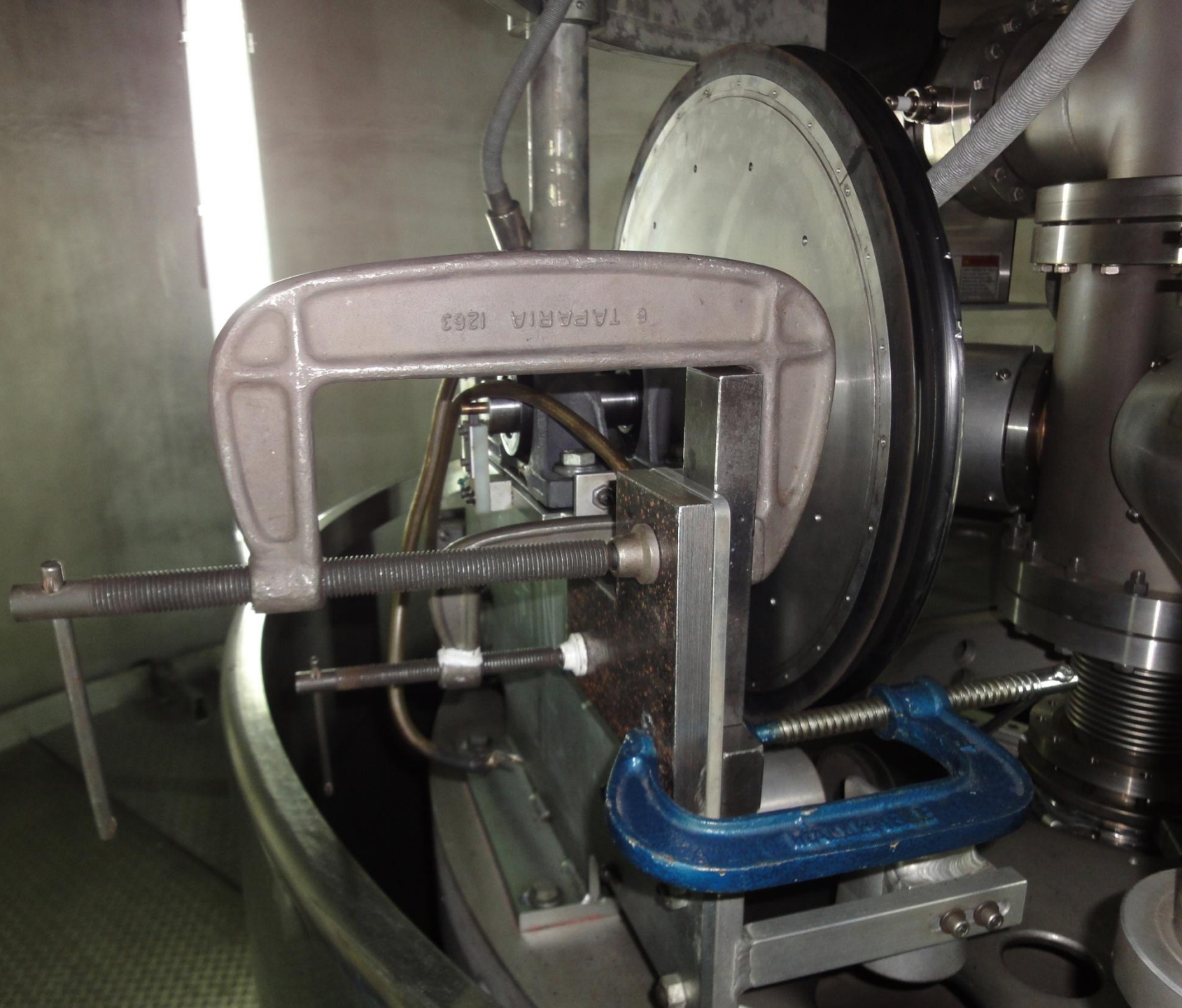


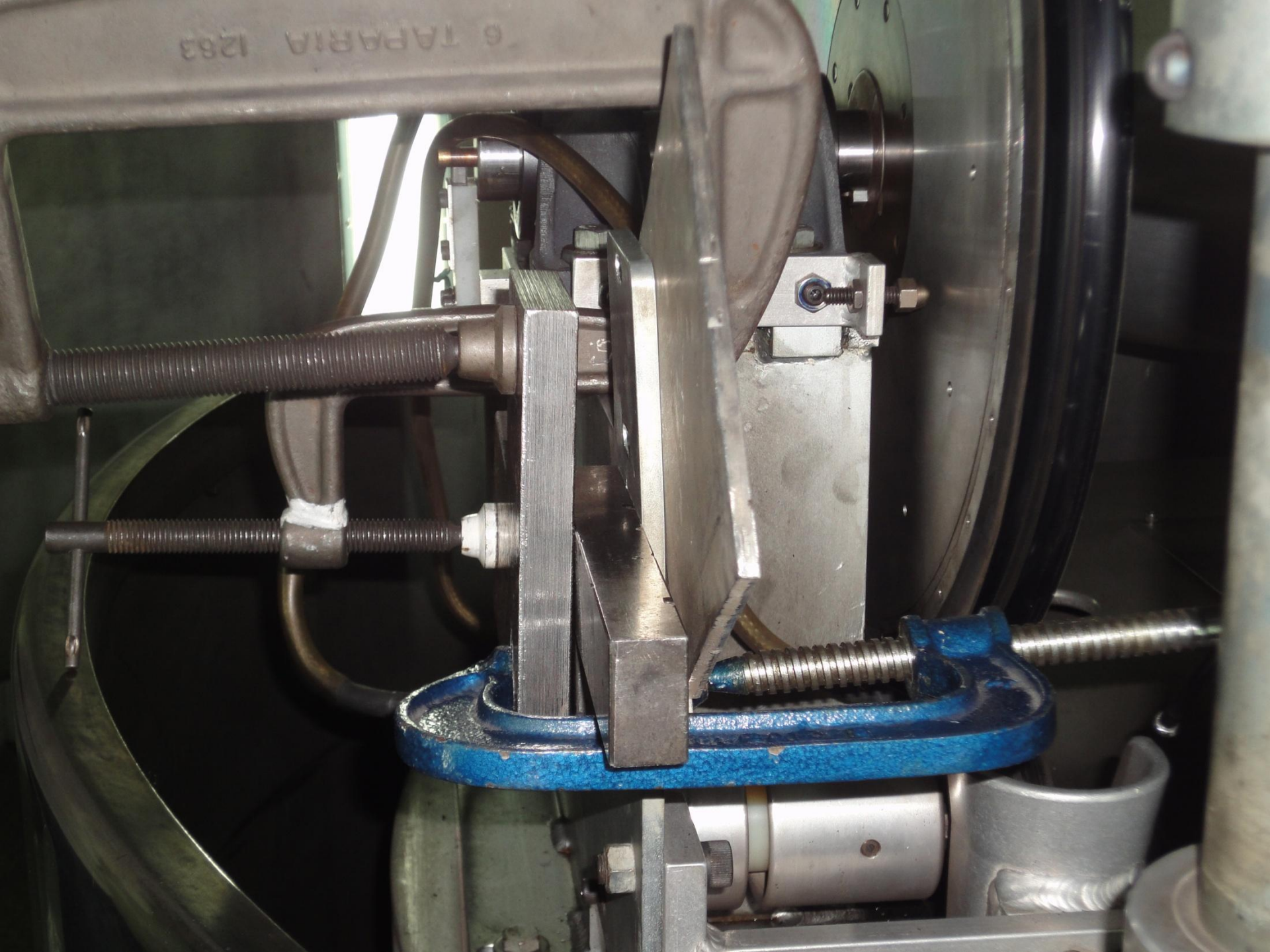


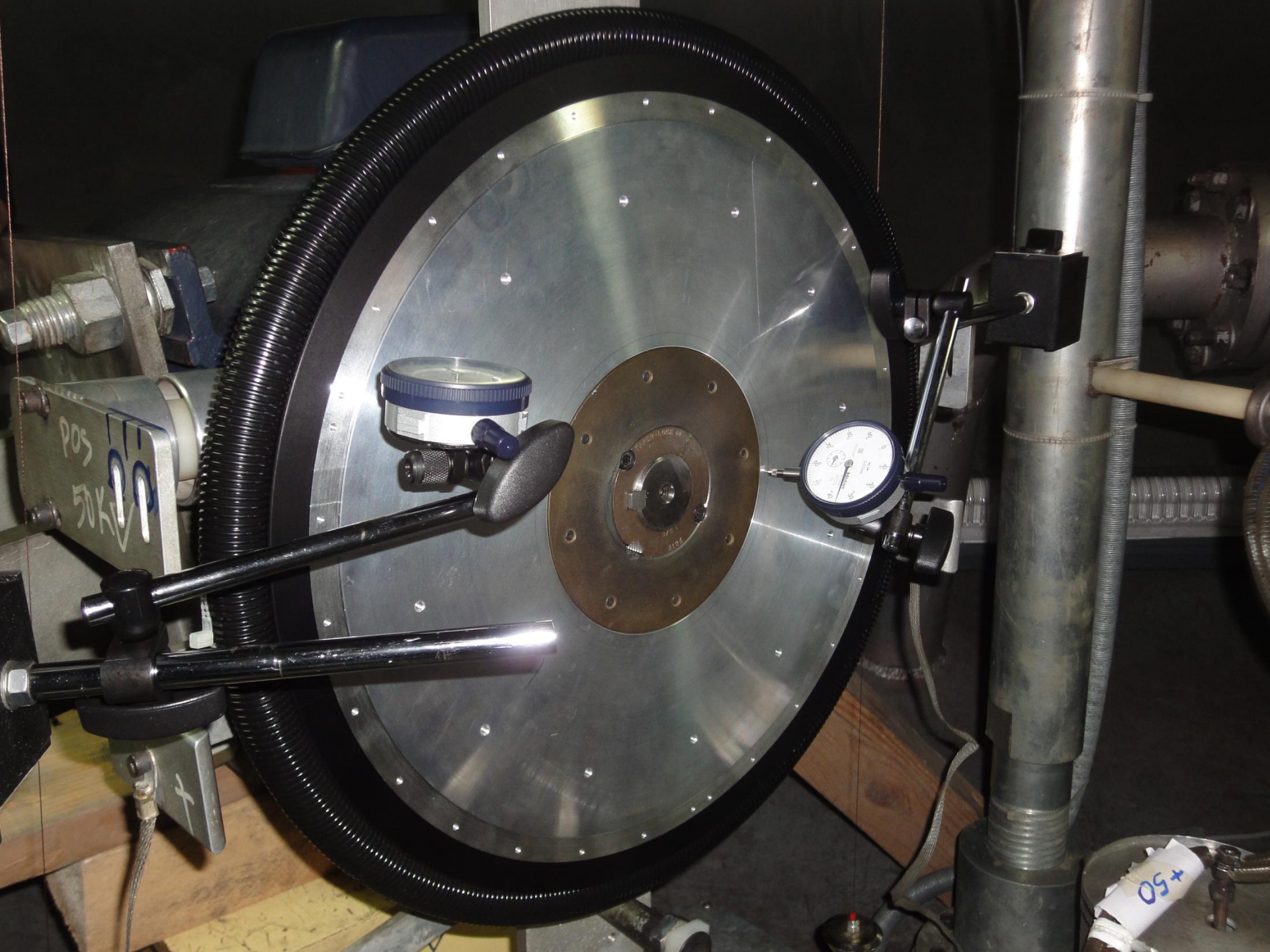












Cause of breaking of charging chain

Loosening of doubler inductor. Chain got stuck to doubler Inductor in running condition.

Charging system #1 severely damaged due to breaking of charging chain. Broke into 6 pieces.

- | | | | |
|------|--|-----|------------------------|
| i) | 35 pellets in unit #19 | ii) | 1 pellet in unit #20 |
| iii) | 3 pellets in unit #21 | iv) | 21 pellets in unit #22 |
| v) | 4 pellets in unit #23 | | |
| vi) | 556 pellets from unit #26 to tank bottom | | |

COMPLETE CHARGING SYSTEM BREAKDOWN

SHUTDOWN ACCELERATOR FOR A MONTH

WHAT WAS THE CAUSE?

WHY DID NOT MOTOR STOP?

DO WE HAVE SPARES?

HOW DO WE COME BACK FAST?

CHARGING SYSTEM WAS REBUILT.NECESSARY TESTS WERE PERFORMED TO CHECK THE CHRAGING CURRENT TRANSFER.

NEW MC-SNICS WAS INSTALLED

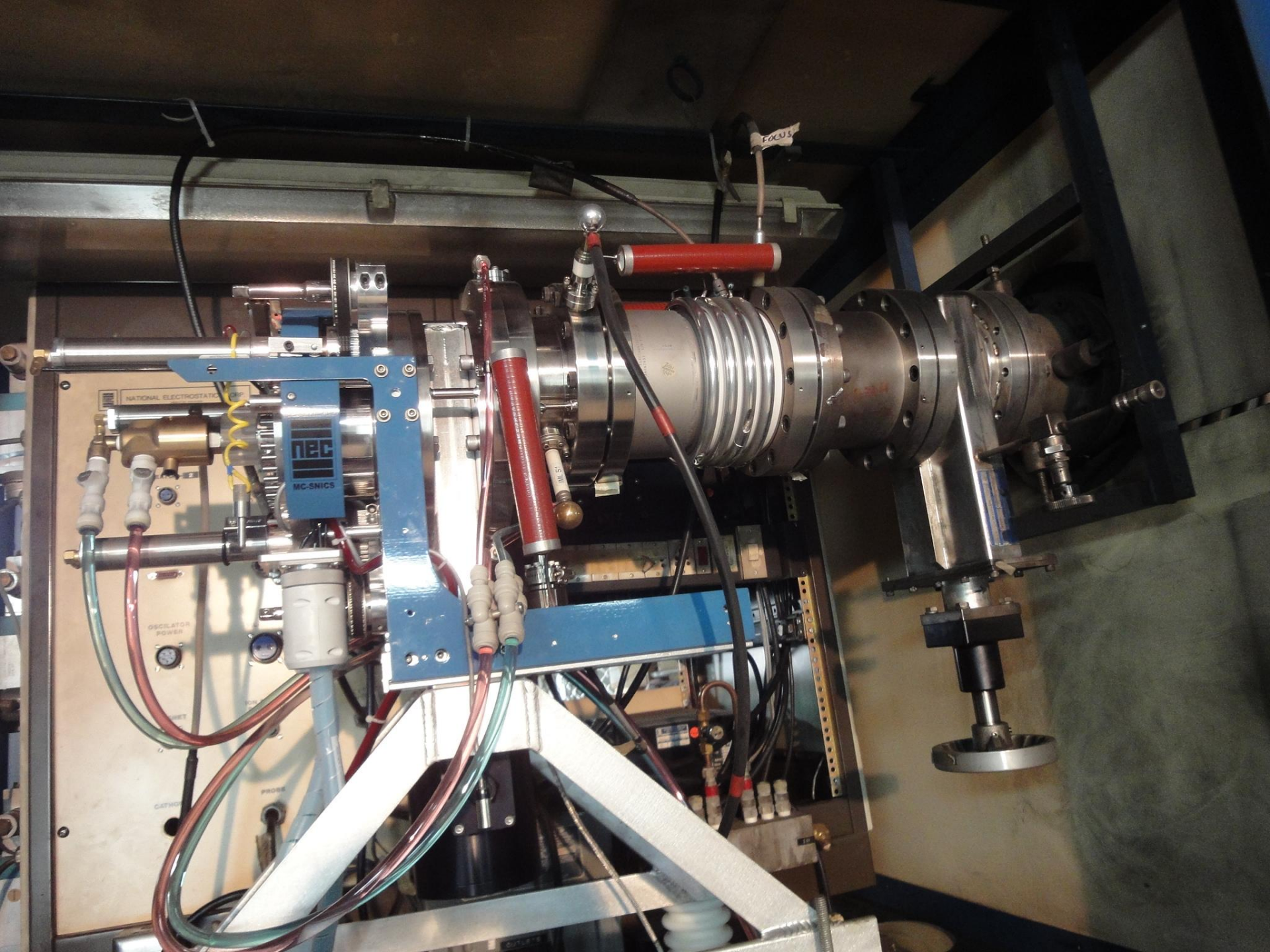
THREE COLUMN SUPPORT POSTS WERE CHANGED.

OTHER JOBS LIKE STRIPPER FOIL REPLACEMENTS, OTHER REGULAR MAINTENANCES WERE PERFORMED.

TANK WAS CLOSED FINALLY..... TO START CONDITIONING OF ACCELERATOR.

PERFORMANCE OF MC-SNICS ION SOURCE:

- Satisfactory performance for regular runs.
- Source had to be opened for cleaning during LINAC runs
- Need to optimize for higher currents beam.
- A NEW MC-SNICS (MODIFIED DESIGN) HAS BEEN BOUGHT
 - Modifications for breakdowns
 - Better Beam Currents
 - No more degradation of GP Tube performance







0042

ANALOGIC

+14.007

TERMINAL VOLTAGE

14333

SLOW

DOWN

MANUAL

RES

ON

POWER

ANALOGIC®

+15.028

TERMINAL VOLTAGE

POWER

MAINS

BATTERY



ALARM OFF

ON



POWER



TERMINAL VOLTAGE

POWER

MAINS

BATTERY



ALARM OFF

ON
POWER

ANALOGIC[®]
+15.050

TERMINAL VOLTAGE

POWER

MAINS

BATTERY

ALARM OFF

BEAM WAS DELIVERED TO USERS

Maximum TP at which beam was delivered: 14.24 MV

(^{107}Ag , 13+, 200 MeV)

Minimum TP at which beam was delivered : 3.51 MV

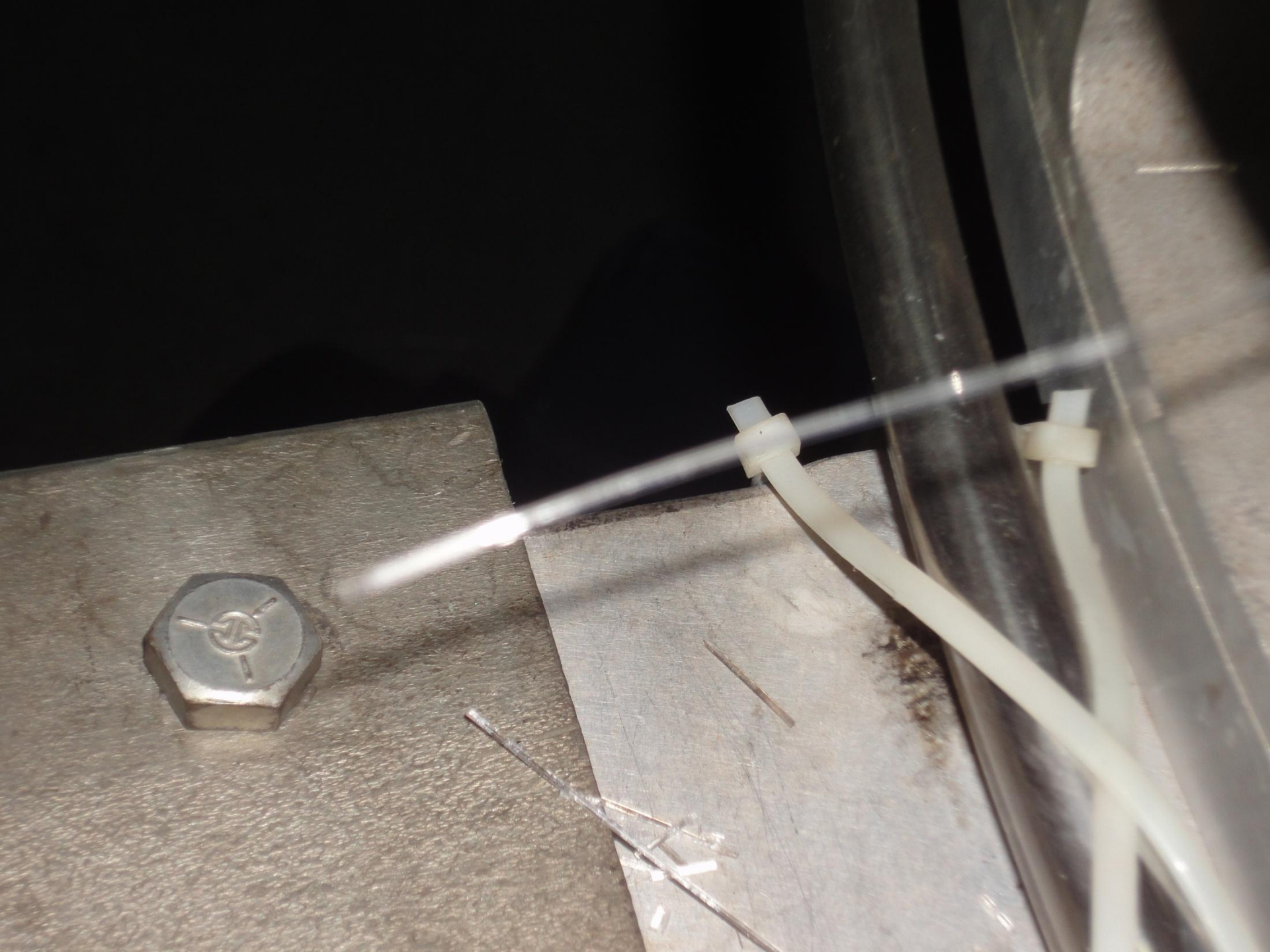
(^1H , 1+, 7.2 MeV)

Second tank Opening Maintenance: Unscheduled Tank opening due to fiber optic cable problem.

Duration from 7th April 2012 to 14th April 2012.









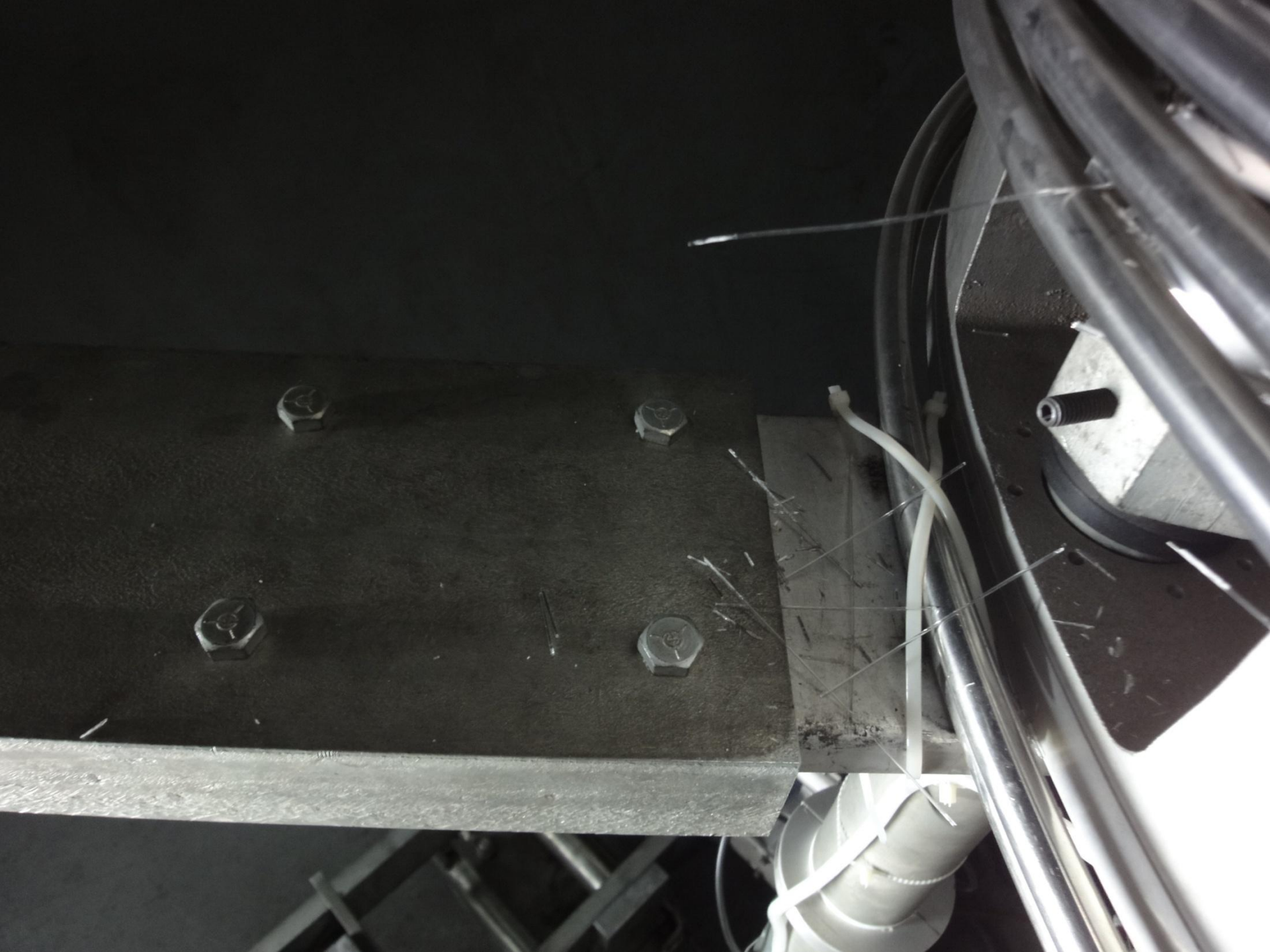






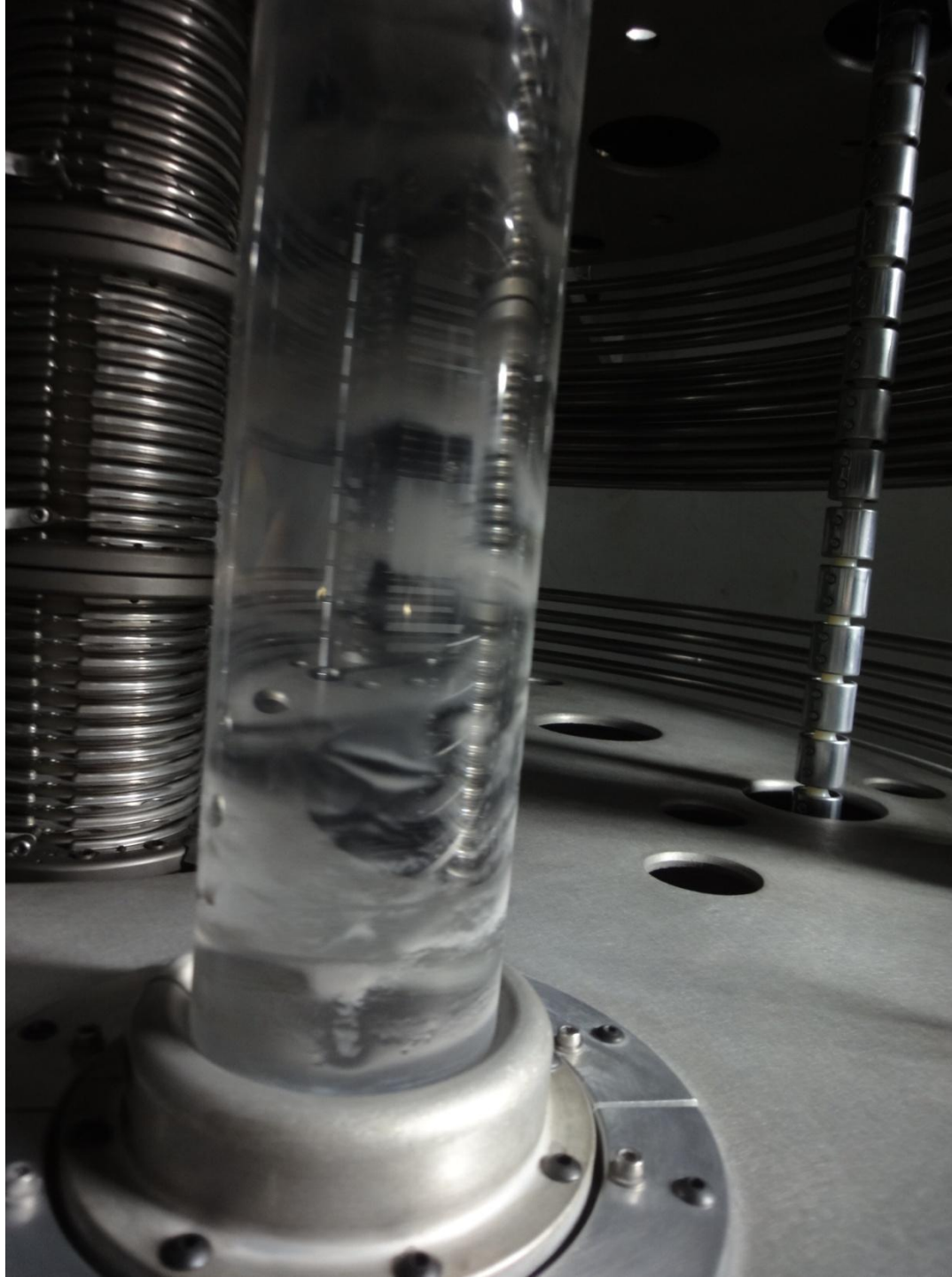
















EARTH QUAKE RAMS TESTING

THE FIRST TESTING BEFORE OPENING TANK WAS TO TEST THE FUNCTIONING OF EARTH QUAKE RAMS TESTING.

WARNING - ARM IS FRAGILE

WARNING - ARM IS FRAGILE

354

VTL



ALARM

LONGITUDINAL

TRANSVERSE

VERTICAL

NORMAL
TEST RESET
(3 Sec. Min.)

SEISMIC ACCELERATION ALARM™
MODEL SAA 300

BATTERY CONDITION

● AMBER (Normal)
FLASHING (Low)

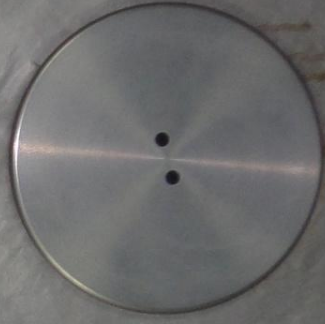


ENGDAHL ENTERPRISES
COSTA MESA, CALIFORNIA 92626





OPERABLE
EARTHQUAKE
INTERLOCK
RANGE



AMS PROGRAM AT IUAC,NEW DELHI

A NEW GEOCHRONOLOGY CENTRE IN INDIA

BY

MINISTRY OF EARTH SCIENCES

Govt. of India

^{10}Be Measurement procedure:

Relative measurement

radio-isotope / stable isotope ($^{10}\text{Be}/^9\text{Be}$)

^{10}B removal:

$$^{10}\text{B}/^{10}\text{Be} \sim 10^6$$

$$Z_{\text{Be}} < Z_{\text{B}}, \quad \Delta Z$$

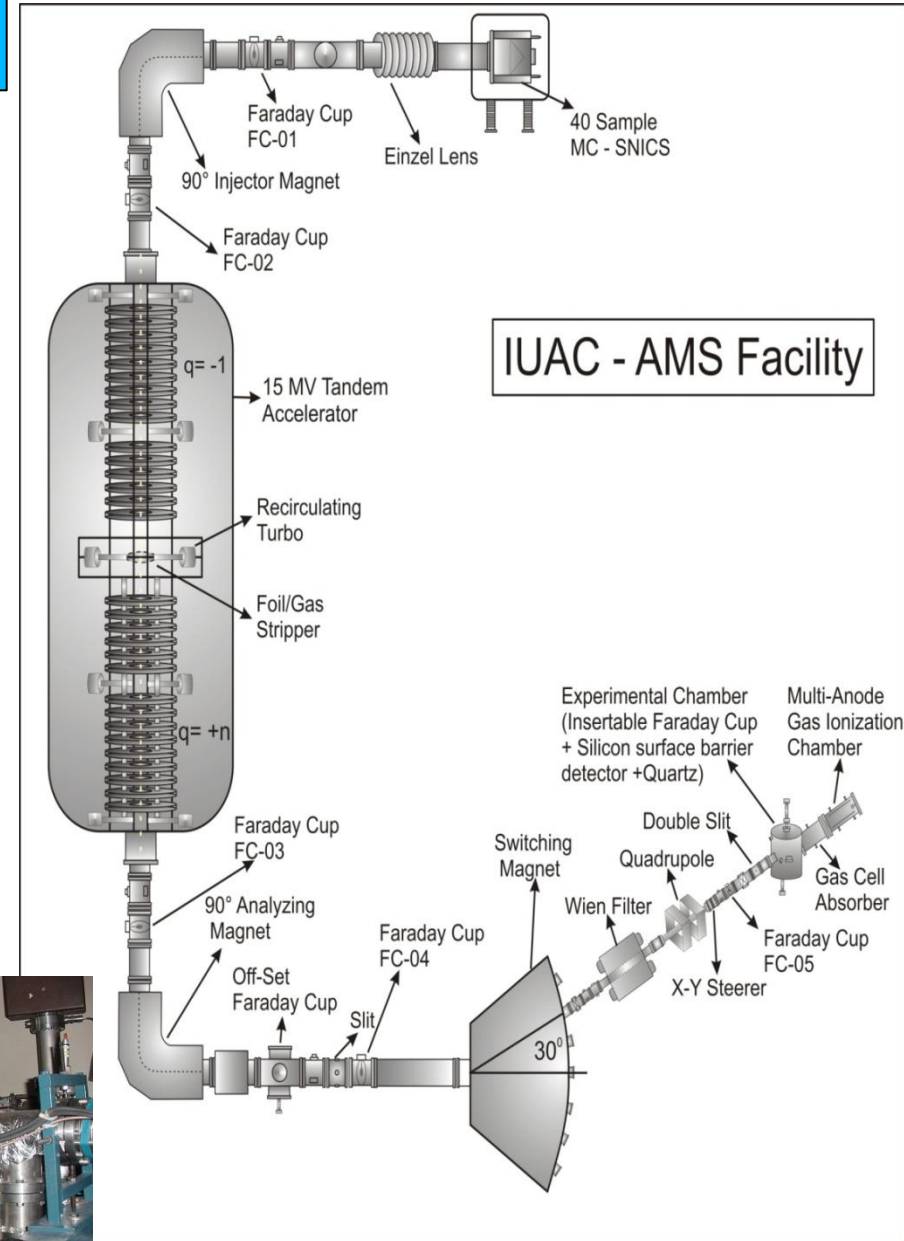
= 1

$$dE/dX \propto MZ^2/E$$

Solution = Gas cell / foil

Any combination of ME/q^2 can pass through-

Wien Filter separates this type of interferences.



$^{10}\text{Be}/^{26}\text{Al}$ studies using IUAC AMS facility

- ❖ **Study of Beryllium-10 Concentration in Southern High Latitudes Sediments (Lake and Ocean)- *NCAOR Goa/MoES***
- ❖ **^{10}Be dating of sediment cores from Central Indian Ocean Basin – *NIO, Goa***
- ❖ **^{10}Be isotope studies on Quaternary sediments of Kaluveli Lake, near Pondicherry, India – *Pondicherry University***
- ❖ **Measurement of cosmogenic ^{10}Be and ^{26}Al abundances in quartz to determine exposure ages of granulites and gneisses from southern India. *Pondicherry University***

$^{10}\text{Be}/^{26}\text{Al}$ studies using IUAC AMS facility

- ❖ Be-10 measurements using AMS on sediment core samples from Indian Ocean and inland water bodies to determine rate of sedimentation: Significance to paleoclimate studies. *Pondicherry Univ.*
- ❖ Determination of ^{10}Be and ^{26}Al in mosses using Accelerator Mass Spectrometry- *Mumbai University- SINP Kolkata*
- ❖ Quantitative estimation of upliftment and erosional rate in the Tista watershed area, *Delhi University*
- ❖ ^{10}Be and ^{26}Al Dating of the Fluvial Terraces for Estimating Fault Slip Rates in Kakrighat Area, Kumaun Himalaya, *BHU -Varanasi*

$^{10}\text{Be}/^{26}\text{Al}$ studies using IUAC AMS facility

- ❖ Studies of cosmogenic radio-nuclides using Accelerator Mass Spectrometry: in perspective to Arctic sediments *IUAC*
- ❖ Cosmogenic ^{10}Be dating of the clay sediments associated with Intra-volcanic bole horizons of Deccan traps *Delhi University*



**WHEN I LEFT OUR LABORATORY, MACHINE WAS
OPEN AND WE HAVE CUT A PELLET.**

OTHER MAINTENANCE JOBS ARE BEING PERFORMED.

THANKYOU