MOPAB209

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COMMISSIONING OF SANAEM RFQ ACCELERATOR

TENMAK
TURKISH ENERGY, NUCLEAR AND MINERAL RESEARCH AGENCY

The 12th International Particle Accelerator Conference - IPAC'21

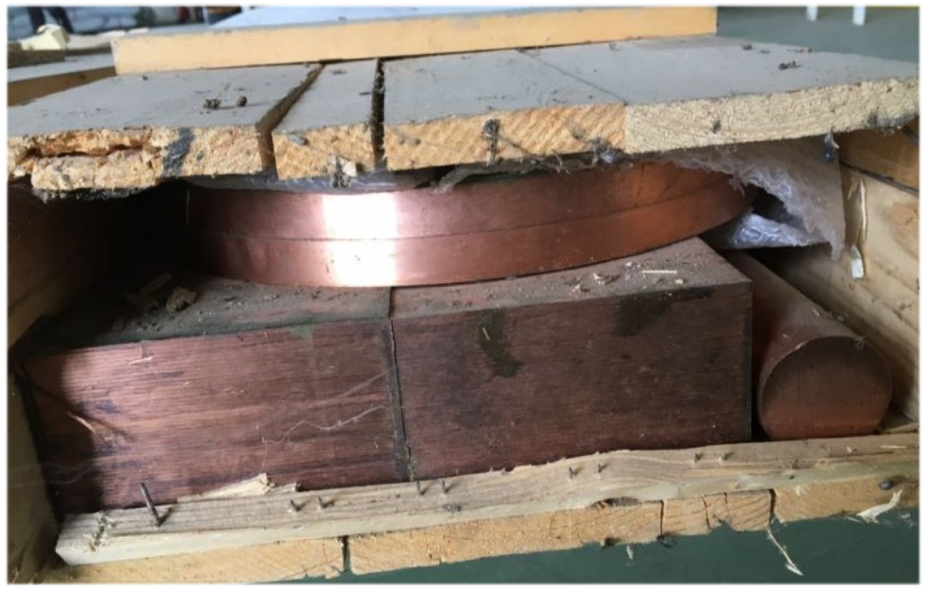
RFQ Design Parameters

Parameter	Value	Unit
Frequency	352.21	MHz
Length	1.2	m
Input Energy	20	keV
Output Energy	1.3	MeV
Beam Current	~1	mA
Inter-vane Voltage	60	kV

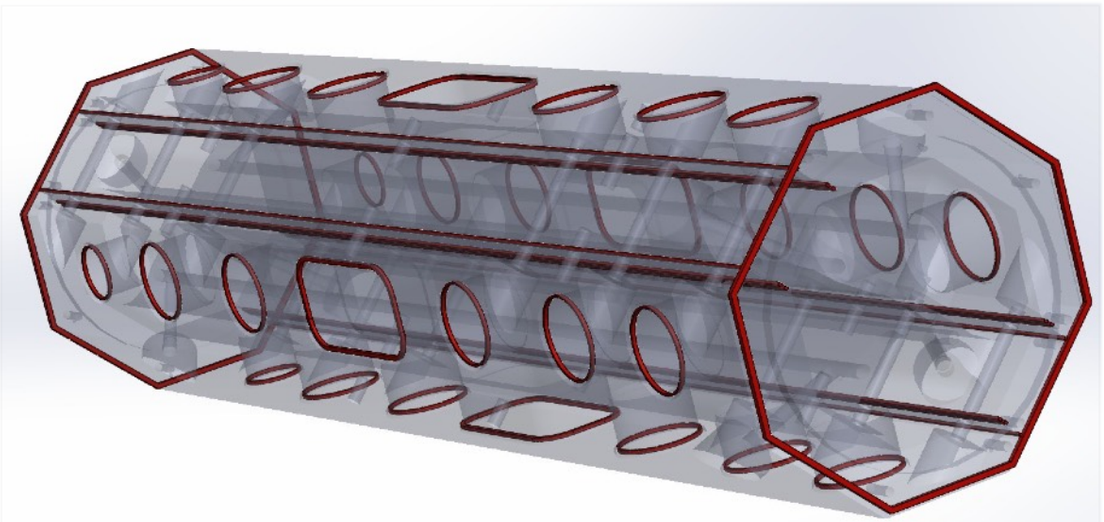
RFQ Cavity Upgrade

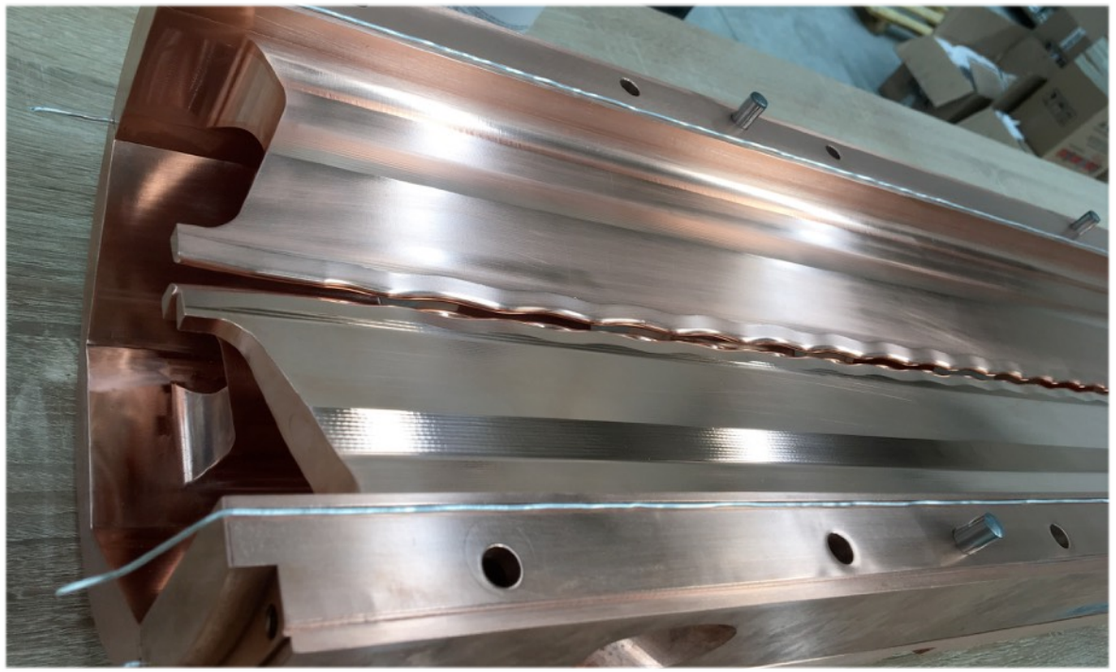
- Inductively Coupled Plasma (ICP) ion source, the Low Energy Beam Transfer (LEBT) line and followed by a RFQ cavity and a beam analyzer magnet.
- An Aluminum RFQ prototype as a cold model was produced for developing electromagnetic measurement skills.
- Manufactured from copper plated aluminum RFQ to test manufacturing capabilities.
- Upgraded with new RFQ made of oxygen-free copper (OFC).

Manufacturing Phase

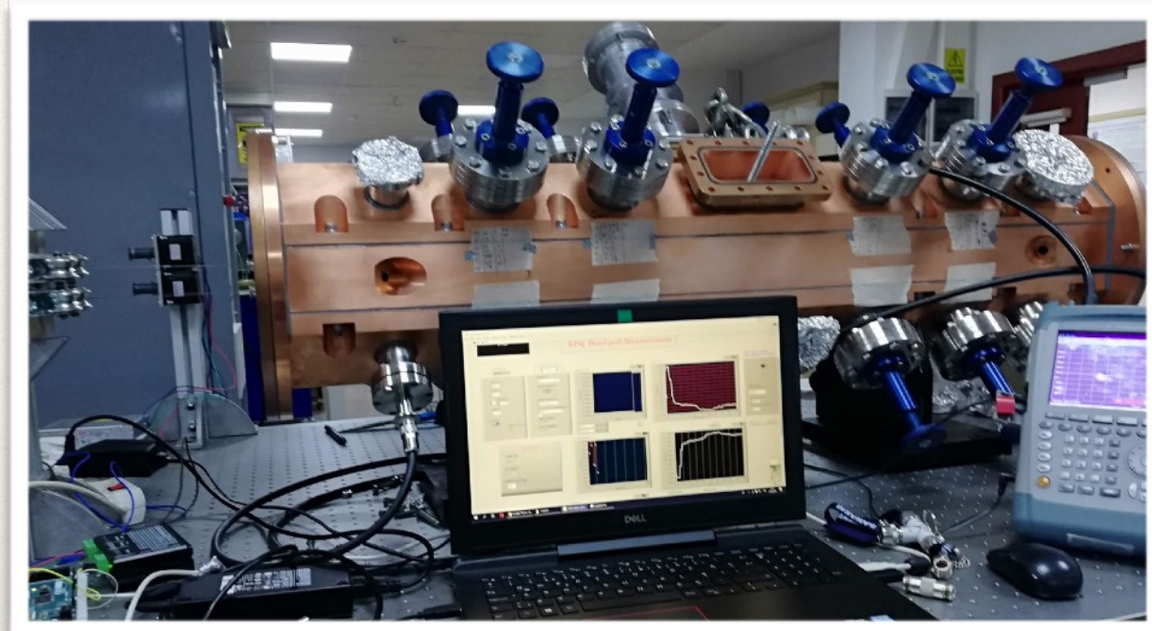


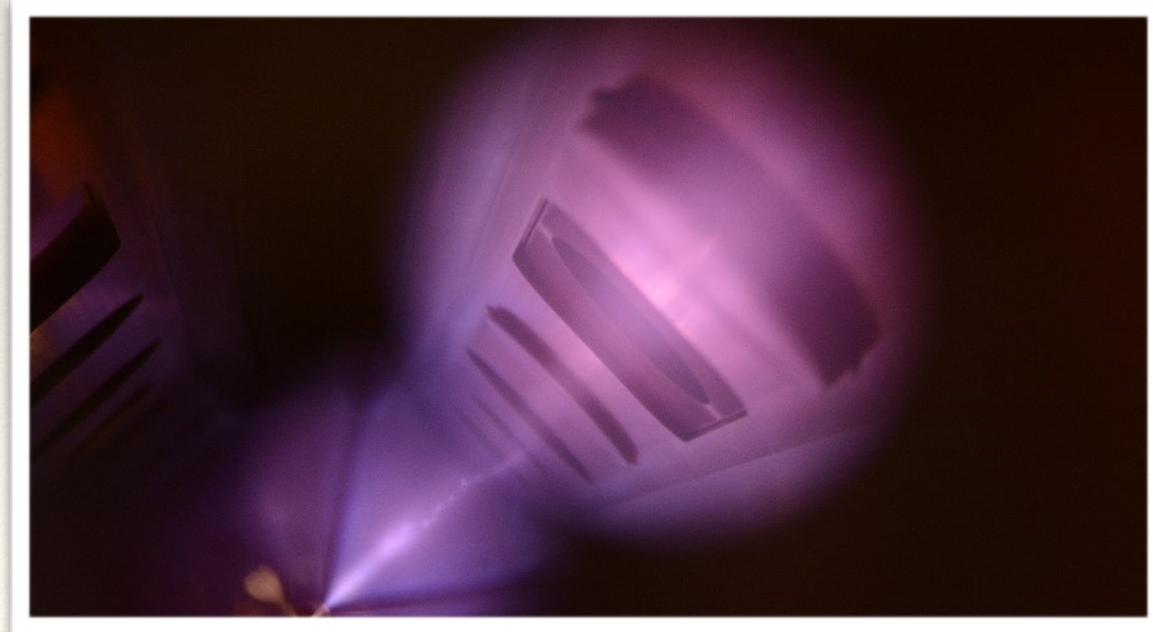
Assembly Phase: Indium Wire

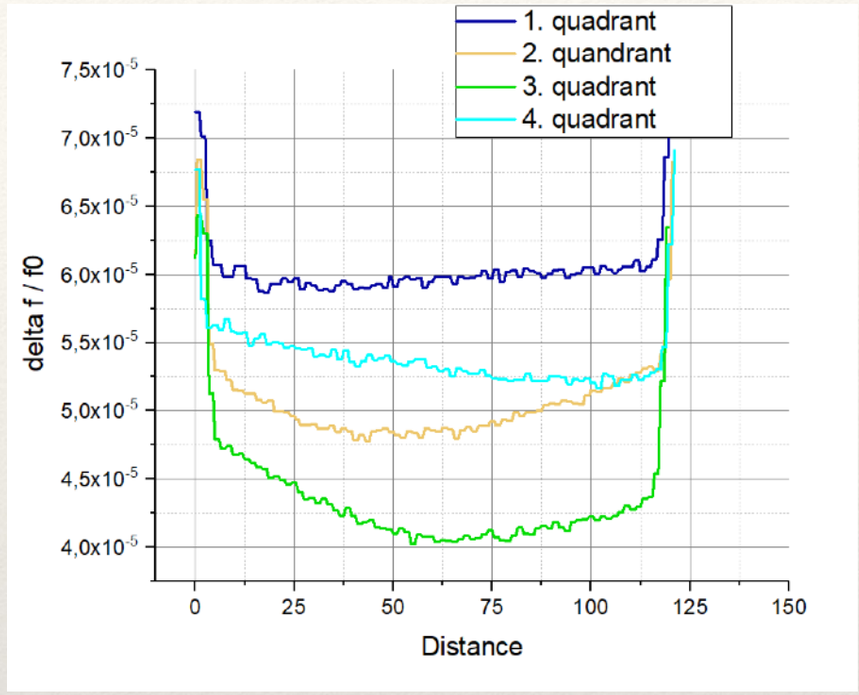




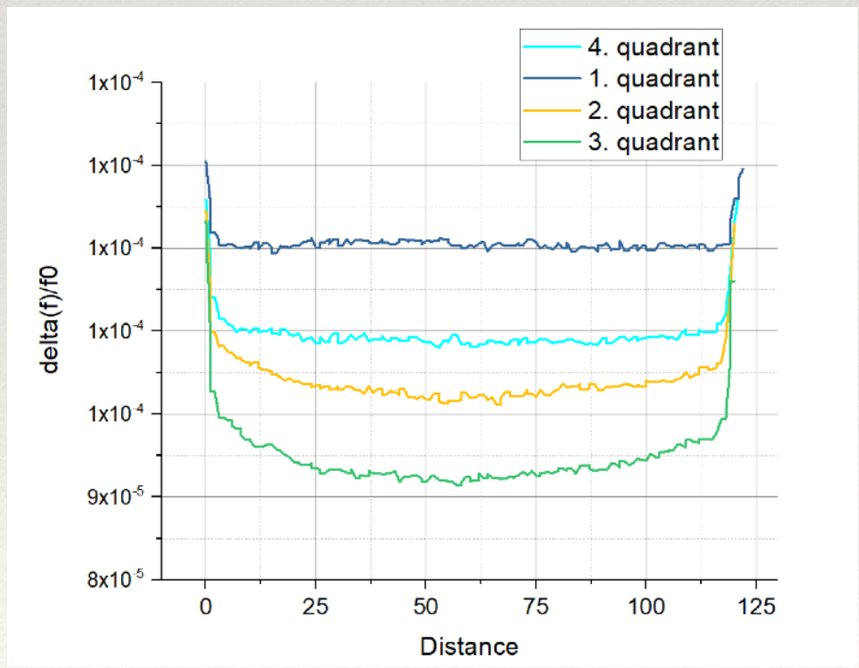
Bead-pull Measurements and Plasma Cleaning







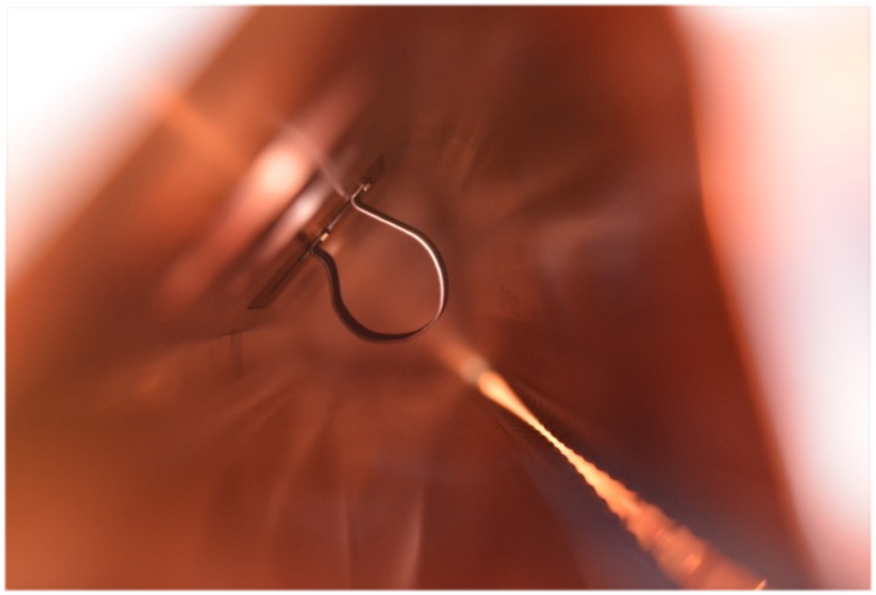
Before

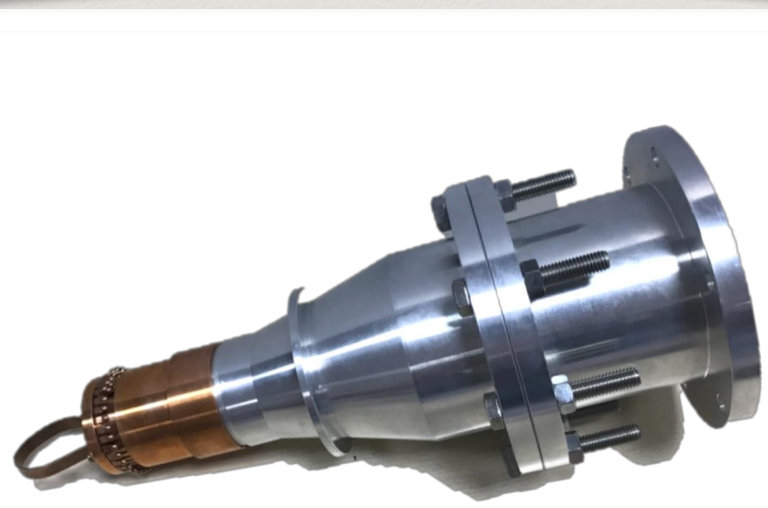


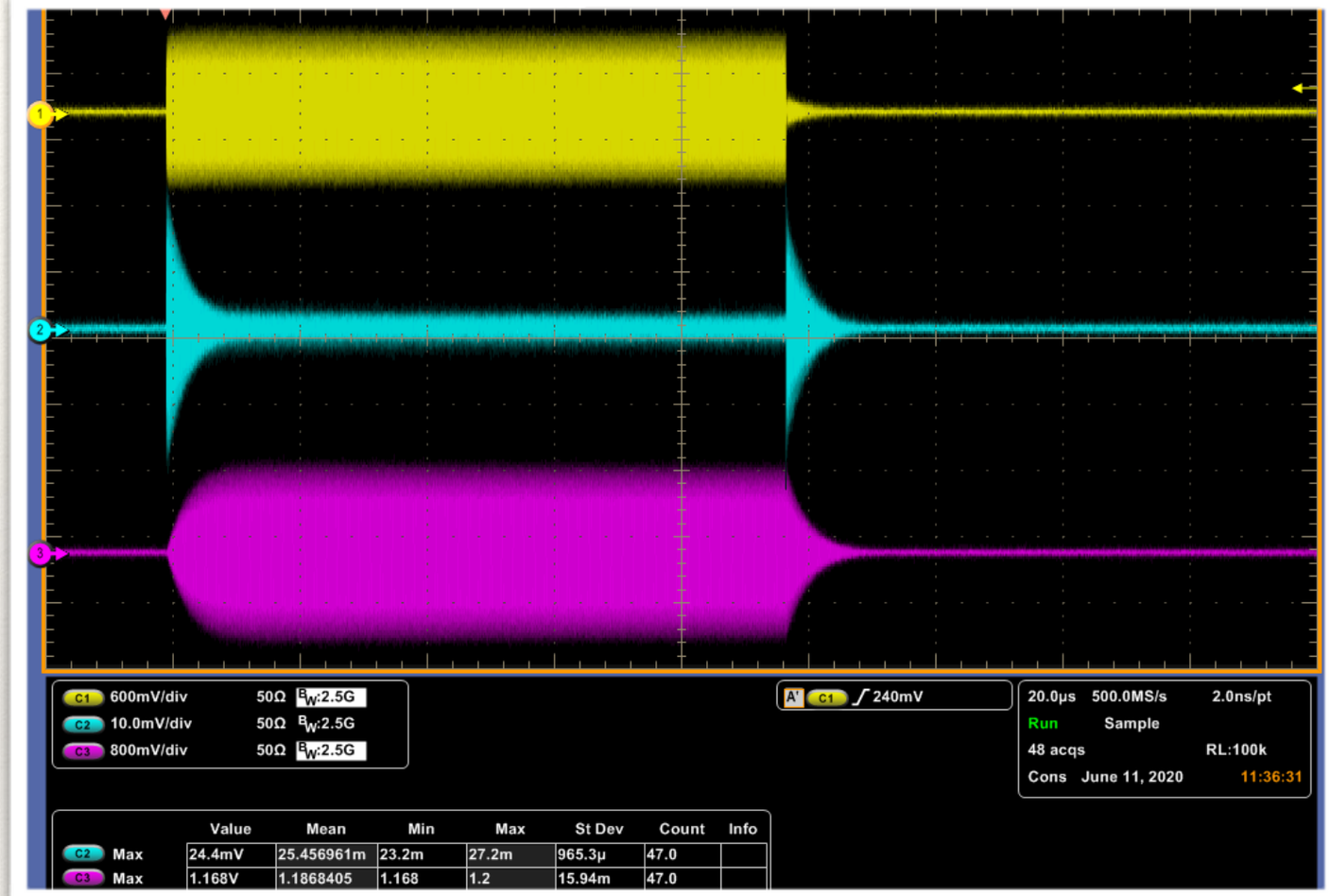
After

Average field flatness: 98.7%

RF Conditioning







- Increase of 5 kW in each step with equal time intervals up to 100 kW.

Beam Commissioning and Conclusion

The first proton beam was accelerated to 1.3 MeV on January 24, 2020.