UED beamline @ ATF

Mikhail Fedurin 02/06/2023





UED beamline: solenoid, vacuum valve, BPM, sample chamber, steering magnet





UED beamline: steering magnet, BPM, detector



UED beamline control

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OOO X /home/control/	C C C X ATF UED RF Controls			
UED System Overview	13-JUN-2016 17:49:37 Modulator HV: ON Comm. Status: 📉			
RF system	UED Modulator / Klystron Supervision		MODULATOR_HIGH_VOLTAGE_SETPOINT 25.000 kV MODULATOR_HIGH_VOLTAGE_READBACK 25.056 kV	
Magnet Control	Aux On Water Doors	HV PS Fault	0.000 32.000	∕∽w∽ sc
Pop-Ins	PLC Smoke Det Ross Relay	Klystmn		
Laser Energy Meters	Heartbeat	Fil. Voltage	KLYSTRON_AMPLITUDE_SEIPOINT 0.200 unk.	SC
Laser Motion Control	PLC Batt. Air Flow Vacuum OK	Klystron Fil. Current	0.000 1.000	
EXIT	Emergency Arc Det. Kly. Fil. / Thy	r. Klystron	KLYSTRON_PHASE_SETPOINT 123.000 deg. KLYSTRON_PHASE_READBACK 0.000 deg.	∕∽w∕≁ sc
	Stop Power Enable	e Core Bias	0.000 360.000 <u>J H Mark Restore</u>	
	Focus Temp. Focus Clipper Current Current	Klystron Fil. Ready	LASER_AMPLITUDE_SETPOINT 0.045 unk.	
ATF UED - Magnet Control	Thy. Htr/Res.			∕-w∕⊶ sc
SOLENOID_SETPOINT 71.000 A SOLENOID_READBACK 71.432 A	Heady		LASER_PHASE_SETPOINT 18.403 deg.	
0.000 200.000	HV On HV Off	HV Remote Control Enabled	LASER_PHASE_READBACK 0.000 deg.	∕∽w≁ sc
	Brookhaven National Laboratory	RESET	J Mark Restore	
-3.000 3.000	Accelerator Test Facility	Interlock Reset		EXIT
UVS_1_SETPOINT -0.330 A	🔿 🔿 🔀 ATF UED - Pop-I	and and the		163326
UVS_1_READBACK -0.328 A	p-In 1 - Inhibit 🔳	AN ANT	A REAL PROPERTY AND A REAL	
-3.000 3.000 Pop-	In 1: INSERT 🔳	A series		1211
UHS_2_SETPOINT 0.000 A UHS_2_READBACK 0.001 A	In 2: INSERT			
-3,000 3.000		Sec. 5	and the second s	A.
UVS_2_SETPOINT 0.100 A	In 3: RETRACT	ALL STOP	and the first	
-3.000 3.000	Valve CLOSE	A. M.S.	STRATE STRATE STRATE	
Brookhaven National Laboratory	EXIT			

UED beamline laser energy monitor



UED beamline first BPM screen (Pylon viewer)



UED beamline dark current studies at first BPM







UED detector image





Beam passed through the aperture









Beam without the aperture



Single shot UED pattern, 20 Hz, Sample: Ta₂NiSe₅



Modulator Voltage: 27 kV Phase setpoint: -129 degree

Following analysis of energy and peak center is based on the analysis of these two peaks 060 and 0-60

Beam energy calibration, compare two date

20 Hz, 02-01-2022, singe shot Energy: 2.58 MeV STD: 0.23% 20 Hz, 01-31-2022, single shot Energy: 2.59 MeV STD: 0.18%



Conclusion: no big difference between 02-01-2022 and 02-02-2022, system stability on 02-01-2022 is slightly better.