JAGIELLONIAN UNIVERSITY
IN KRAKÓW

SOLARIS
NATIONAL SYNCHROTRON
RADIATION CENTRE

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Magnets status at SOLARIS

2nd PerMaLIC Workshop, 3-4 Nov. 2022

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SOLARIS National Synchrotron Radiation Centre

OVERVIEW

- Machine overview
- Electromagnets
- Permanent magnets

SOLARIS OVERVIEW

600 MeV LINAC

Source: RF Thermionic Gun

6 accelerating structures combined in 3 units

Accelerating gradient 20 MeV/m

S-Band units – 2998.5 MHz

3 RF Units & SLED cavities

Fully operational since Dec. 2014

1.5 GeV STORAGE RING

12 DBA Cells – 96 m circumference

10 straight sections available for ID's ~ 3.5 m

100 MHz RF System

300 MHz Landau Cavities

Injection dipole kicker

Ramping

Fully operational since May 2015

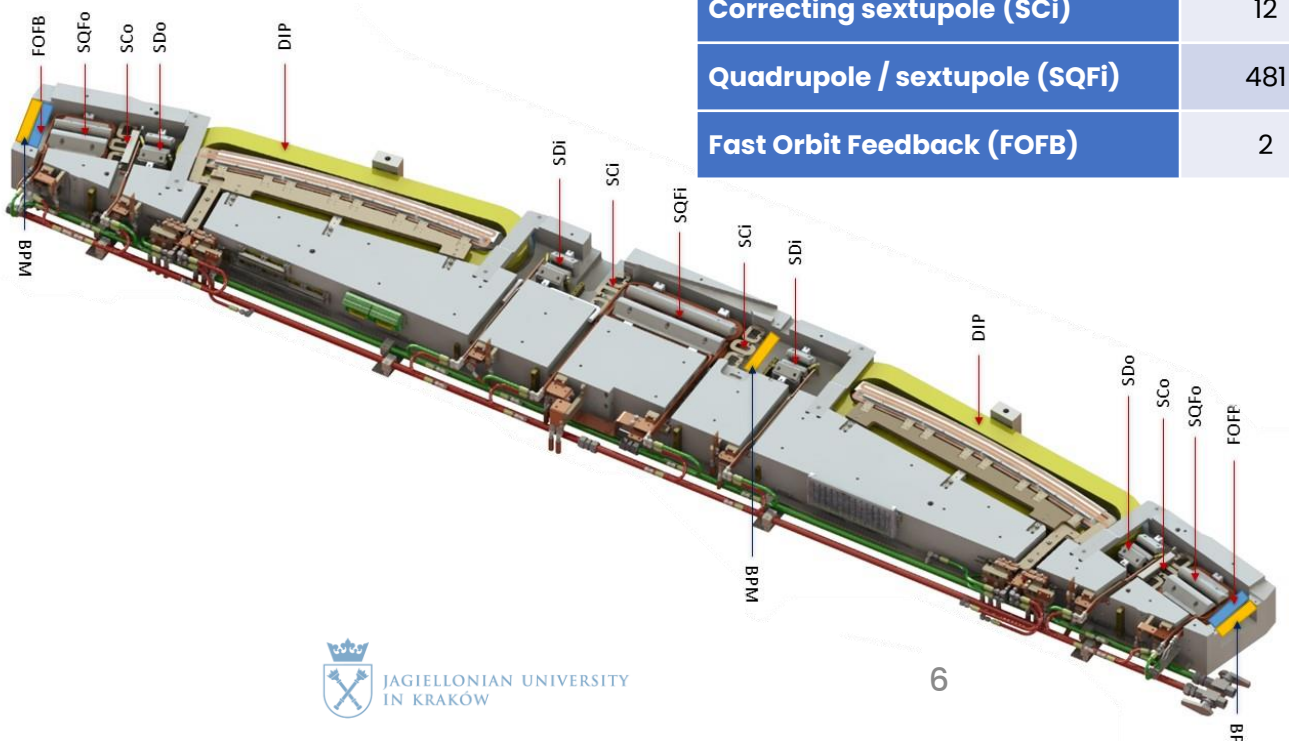
STATUS OF THE ELECTROMAGNETS (1)

This chart gathers information from Linac, Transfer Line and Storage Ring

EM embedded into the synchrotron	Imax [A]	P @ Imax [W]	Q-ty	Field [T]
Quadrupole (QE-type)	6.3		4	0.5
Dipole H/V – corr. (E-type)	4	17.2	10	0.036
Quadrupole (QB-type)	110	1100	2	0.538
Dipole H/V – corr. (D-type)	4	30.4	6	0.036
Extraction septum (SM1A, SM1B)	86.7	1352	2	5
Bending dipole (DIE, DIF)	129	4930	2	1.6
Quadrupole (QF-type)	110	1100	6	8.152
Kicker dipole magnet	I_{peak} = 1.085 kA	f = 10 Hz $U_{charg.}$ = 9.5 kV	1	0.057
Pinger dipole magnet	I_{peak} = 2.05 kA	f = 10Hz $U_{charg.}$ = 7.5 kV	1	0.051

STATUS OF THE ELECTROMAGNETS (2)

EM embedded into a single DBA	Imax [A]	P @ Imax [W]	Q-ty
Quadrupole / sextupole (SQFo)	262	722.5	2
Correcting sextupole (SCo)	12	11.5 x-corr. / 7 y-corr.	2
Sextupole (SDo)	329	614.6	2
Dipole (DIP)	766	1933	2
Sextupole (SDi)	241	330	2
Correcting sextupole (SCi)	12	11.5 x-corr. / 7 y-corr.	2
Quadrupole / sextupole (SQFi)	481	1299	1
Fast Orbit Feedback (FOFB)	2	10	2



STATUS OF THE PERMANENT MAGNETS

Beam Line	04 - DEMETER	05 - UARPES	06 - PHELIX	SOLCRYS
ID type	EPU	EPU APPLE II type, quasiperiodic	EPU APPLE II type	No source specified Originally: SCW from BINP Now: 3 pole wiggler or SCW from another supplier
Type of magnets	Permanent NdFeB NEOMAX 39SH	Permanent NdFeB	Permanent NdFeB	
Magnetic period length	46.6 mm	120 mm	58 mm	
Number of periods	44	21	44	
Minimum gap	14 mm	20 mm	14 mm	
Maximum gap	> 200 mm	140 mm	220 mm	
Length of magnet assemblies	2116.9 mm	2669,9 mm	2676.6 mm	
Total length of undulator	2136.9 mm	2699 mm	2700 mm	
Peak B field at min. gap	0.58 T	0.774 T	V: 0.879 T H: 0.685 T	
Available energy Range	100 – 2000 eV	total: 8–100 eV NIM: 8 eV–30 eV PGM: 16 eV–100 eV	50–1500 eV for linear horizontal, linear vertical, and circular polarization 70–1500 eV for linear polarization inclined at 45°	
Polarization	Circular left- and right-handed, linear horizontal and vertical	Circular, elliptical, linear horizontal and vertical, linear skewed.	Circular, elliptical, variable linear	
Manufacturer	ADC	Kyma	Kyma	

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THANK YOU FOR YOUR ATTENTION