MAX IV AND SOLARIS LINAC AND TRANSFER LINE MAGNETS

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- **Whereas the MAX IV storage ring magnets are designed as "magnet blocks", with many consecutive magnet elements machined out of a common iron block (→), all the linac and transfer line magnets are conventional designs.**
- **There are 28 different magnet types in the linac and transfer lines.**
  - **Some of these are close variants of the same designs.**
- **Most were new designs for MAX IV,**
  - **but some are old designs that were re-used.**
- **Some magnets were build to print-orders,**
  - **others had the supplier do the manufacturing drawings.**
- **The suppliers were responsible for mech. tolerances, and some amount of field measurements were specified for all types.**
- **MAX-lab was responsible for magnetic design and field measurement results in all cases.**
- **The Solaris linac uses the same components as MAX IV, including magnets.**

SOLARIS
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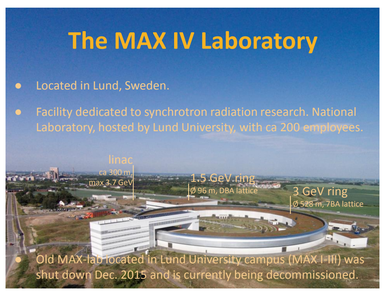
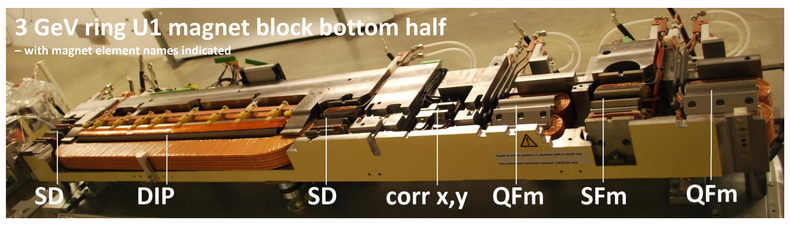




The Solaris linac consists of,
- Thermionic gun identical to MAX IV (mirror identical).
- Six S-band accelerator structures
- Transfer line identical to MAX IV TR1 (except without the pair of dipoles (DIH) that selects if the beam is taken up into the transfer line or straight through the septum channel)

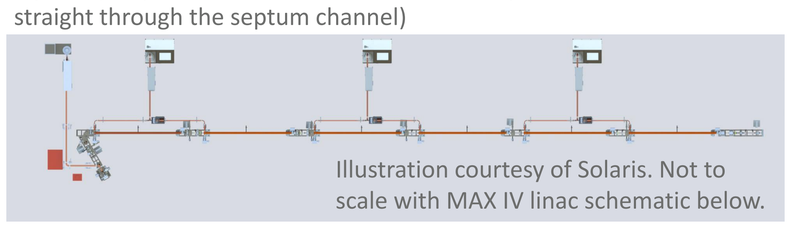
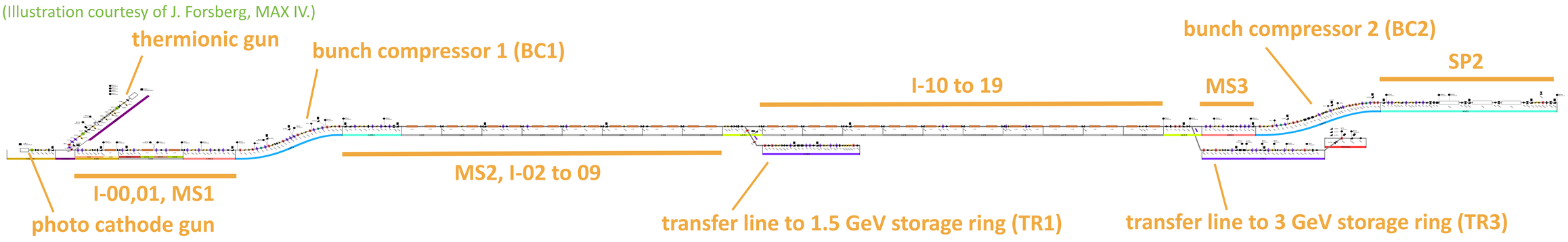


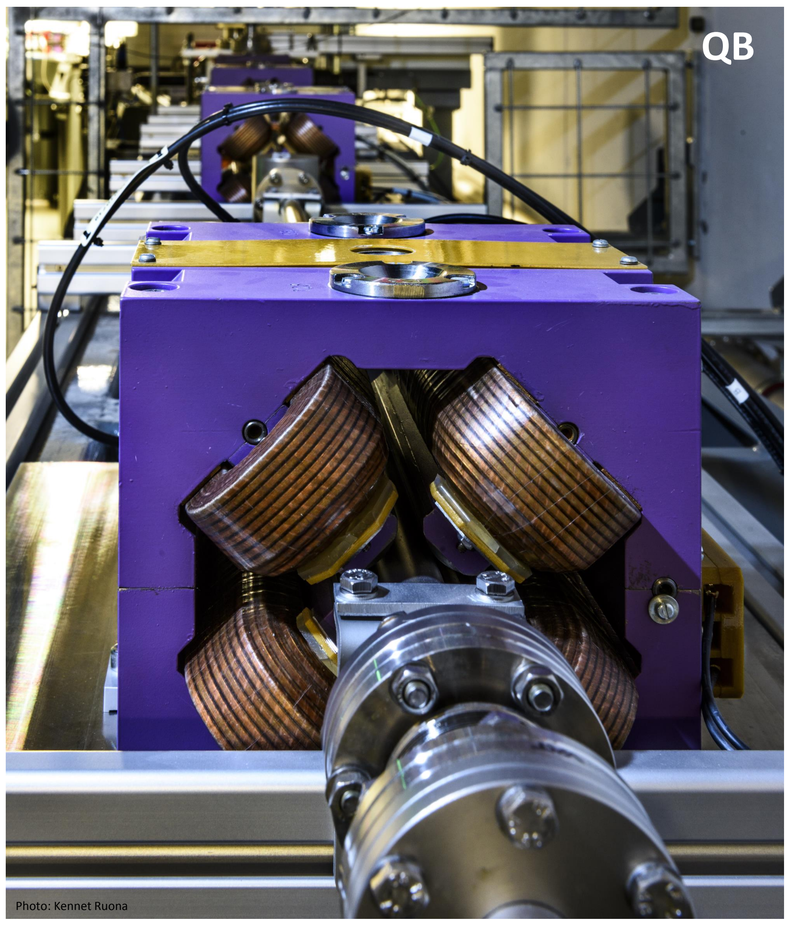
Illustration courtesy of Solaris. Not to scale with MAX IV linac schematic below.

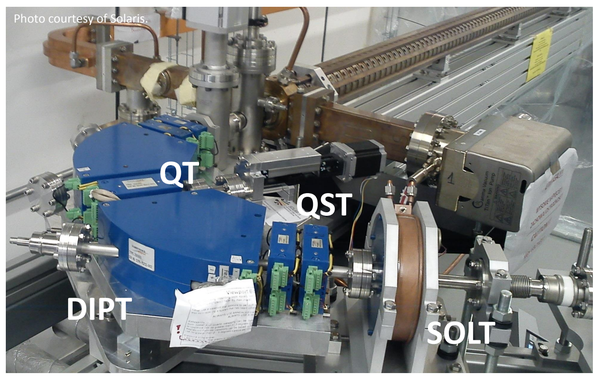
MAX IV linac layout

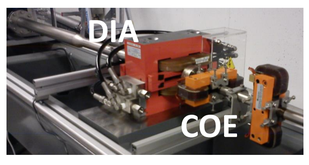
Schematic used in the control system "linac synoptic" GUI, with section names indicated:
(Illustration courtesy of J. Forsberg, MAX IV.)

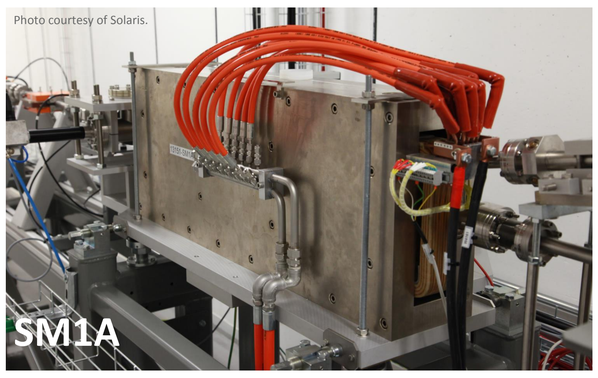


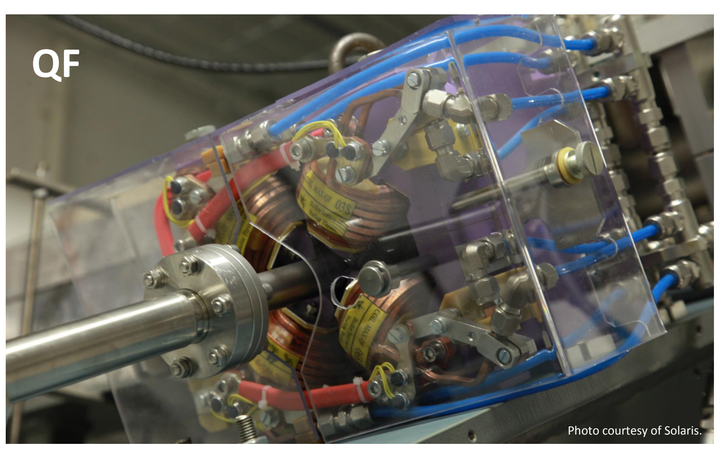
Magnet types

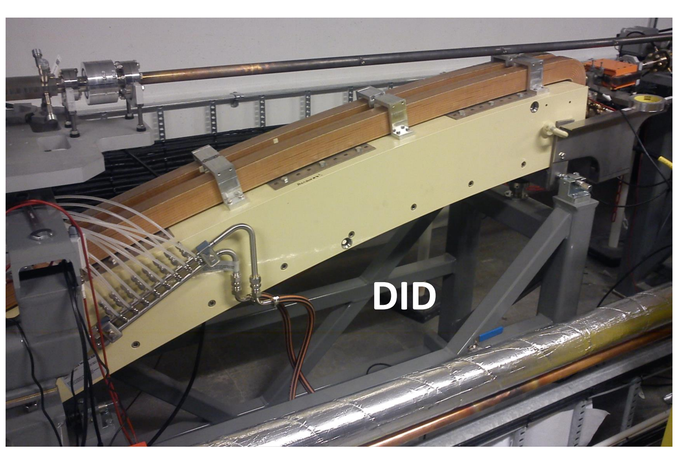












Full list of linac and transfer line magnets. Locations are MAX IV (cf. above schematic) and numbers are MAX IV + Solaris.

MAX IV name	No [pcs]	Location	l_{eff} [m]	Field	Supplier
DIA	8	BC1	0.1	0.667 T 2.607 T/m	SigmaPhi
DIB	8	BC2	0.55	1.152 T 8.529 T/m	Scanditronix
DIC/D	2	TR3	1.8	1.6 T	Scanditronix
DIE/D	2+2	TR1	0.93	1.6 T	Scanditronix
DIH	4	TR1, TR3	0.4	0.7 T	Danfysik
DIPBD	1	SP2	2.478	2.0 T	Danfysik
DIPT	2+2	gun area	0.15	0.1 T	Scanditronix
SM1A/B	2+2	TR1	1.027	0.85 T	Danfysik
SM3A/B	2	TR3	1.027	0.85 T	Danfysik
SOLA	1	gun area	0.16	0.4 T	RadiaBeam
SOLT	2+2	gun area	?	0.1 T	Scanditronix
QB	17+2	MS1–I-16	0.2	10 T/m	BINP
QD	4	BC1	0.1	5.4 T/m	Danfysik
QE	4+4	I-01	0.07	10 T/m	Scanditronix
QF	30+6	TR1/3, MS3–SP2	0.2	40 T/m	BINP
QST	4+4	gun area	0.025	7.5 T/m	Scanditronix
QT	1+1	gun area	0.04	5.2 T/m	Scanditronix
SXH	2	BC2	0.1	570 T/m2	Scanditronix
SXL	2	BC1	0.1	27.2 T/m2	Danfysik
COB	1	gun area	0.13	5 mT	Scanditronix
COD	45+7	TR1–SP2	0.14	36 mT	Danfysik
COE	21+9	I-00–I-07	0.07	36 mT	Danfysik
COH	2+2	gun area			Scanditronix
COI	5+5	gun area			MAX-lab

Status

The linac installations at MAX IV and Solaris were completed in 2014 and both are used routinely to inject into the storage rings, and in the case of MAX IV, as a driver for short pulse X-rays at the end of the linac.

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