

RF Power Sources for the ILC

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Requirements

- 10MW, 1.5ms, 5Hz as in TESLA TDR
- What is available or almost available today?
MBKs with 10MW, 1.5ms, 10Hz at 115kV and 135A
- What could be done in addition ?
Sources with same parameter as MBK or sources with different parameter might be considered

Available 10MW MBKs



Thales



CPI



Toshiba

Status of the 10MW MBKs

- Thales: 4 Tubes produced, arcing problem seems to be solved, more tubes are in production
- CPI: Prototype factory tested, now for acceptance test at DESY
- Toshiba: Prototype reached 10MW, 1ms, 10Hz
- Horizontal 10MW MBK soon

Alternatives to be considered

5MW HOM IOT

Peak Output Power	5	MW (min)
Average Output Power	75	kW (min)
Beam Voltage	115	kV (nom)
Beam Current	62	A (nom)
Current per Beam	5.17	A (nom)
Number of Beams	12	---
Frequency	1300	MHz
1dB Bandwidth	4	MHz (min)
Gain	22	dB (min)
Efficiency	70	% (nom)
Solenoid Power	1	kW
Cathode Loading	1.0<	A/cm ²

10MW SBK

Parameters similar to
10MW MBK



LV 10MW MBK

Voltage e.g. 65kV

Current 238A

More beams



Summary

- 10MW MBKs from 3 different vendors are available or almost available, horizontal versions must be constructed and built and will be used for the XFEL
- 10 MW SBK might be an additional source
- IOTs and LV MBKs require other modulators as 10MW MBKs
- The development of a new type of high power RF source always requires several years
- 10MW MBKs should be chosen as sources for baseline, alternatives could be developed if enough resources are available to make the 10MW MBKs cheap, reliable, high efficient etc.