

Power Coupler

H. Matsumoto (Asia)
S. Noguchi

S. Belomestnykh (Americas)
B. Rusnak

W.-D. Möller (Europe)
A. Variola
T. Garvey

Baseline Configuration choice - Cylindrical window TTF type coupler.

Easy modification (not requiring significant R&D) of existing TTF-III coupler

Modification – TTF-V, increase cold part o.d. from 40 mm to 60 mm.

↪ pushes up multipactor power levels ↪ good for higher future gradients.

Expect none / little cost impact of this modification

Possible disadvantage of this change – transverse “kick” of beam ↪ emittance dilution.

Further R&D necessary –

- Processing – in progress at Orsay
- Cost – should be reduced through industrial studies for X-FEL

Time scale – 2 years in both cases.

Pros	Cons
Existing design – 52 manufactured in industry	cost
Operating experience – 100,000 coupler hours Ran with cavity @ 35 MV/m Tested to 1 MW, 1.3 ms in TW	Processing time

Alternative Configuration choices - Planar disk window couplers

Three identified – no order of priority

- “Capacitive” disk window coupler
- ‘Tristan’ like disk window coupler
- Travelling Wave 60 coupler

Pros - All disk windows relatively free from multipactor ?

Capacitive disk window mechanically simple – ease of fabrication (cost, cleaning)

All thin disk windows can be placed at low E-field position.

Simpler (cheaper) to braze thin-window (but not reflected in proto-type prices)

TRISTAN like windows have long history of success.

Cons – Capacitive coupler cannot be DC biased.

Capacitive and Tristan couplers are *fixed coupling* (Q_{ext}).

All disk ceramics are in ‘line-of-sight’ of beam pipe (serious ??).

Cost impact – Too early to evaluate

Time scales for R&D - TW60 → 2 years to evaluate proto-type

“Capacitive” coupler → KEK foresee high power test, early 2006