

ELECTRICAL POWER SYSTEM

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AC AND DC POWER SYSTEM FOR ANTARES
SINGLE CONDUCTOR + SEA RETURN
LOSSES - STABILITY

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NEHG - 3-PHASES PROPOSAL

- NO ENVIRONMENTAL ISSUE (NO SEA RET)
- EASY VOLTAGE CONVERSION
- EASY SWITCHING

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POWER DISTRIBUTION CONSIDERATIONS
FOR A KM3 SCALE DETECTOR

Long distance power network: AC or DC?

POWER ? **DISTANCE ?**

50 kw ?

100 km ?

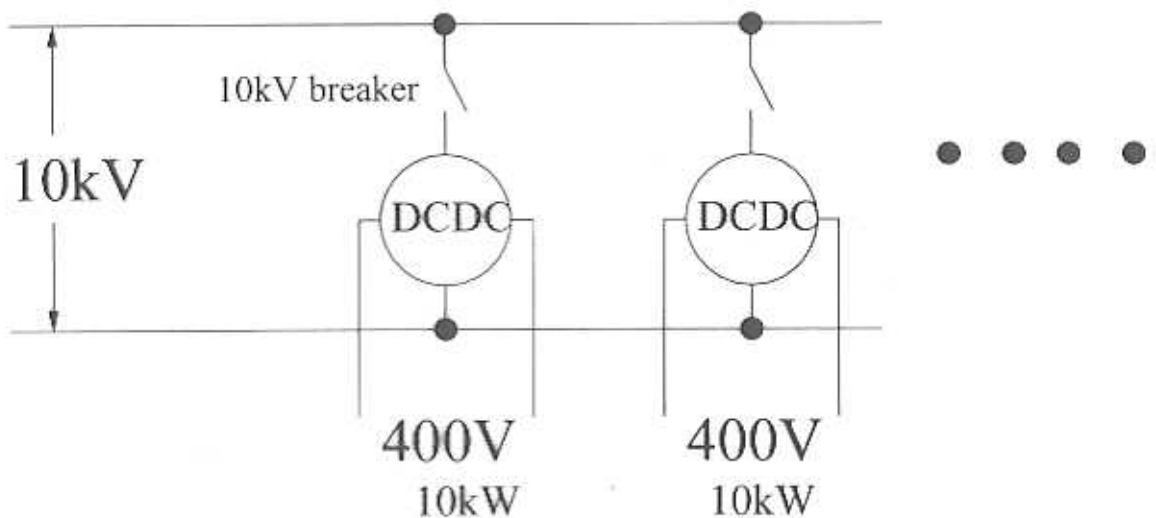
- AC
 - Decrease the frequency → the transformer becomes too big
 - Increase the frequency → capacitive short circuit → LOSSES

→ REDUCED LOSSES, EASY CONVERSION, NO PARTIAL DISCHARGE, CABLE COST

- DC ? Need high input voltage DC/DC convertor inside the JB

DC/DC convertor: Typ. 10kV input, 400V output

A single 100kW unit or ten 10kW units



Reliability of the DC/DC convertor? of the 10kV breaker?

Power dissipation? Volume?

JPL/NASA/NEPTUNE DC/DC

Sea or Cable return?

Cable return double the weight of Cu (DC or single phase AC)

==> double the weight of steel needed
(function of max depth)

==> double the cable weight

==> double the cost of the cable

LOSSES $\times 4$

If the sea return works reliably, why don't we use it?

For a given cost, 2 redundant (sea return) cables
are better than a single (cable return) cable

USE STANDARD TELECOM CABLES
(ANTARES - NEPTUNE)

108 lines network with 2 redundant PS

- WET MATEABLE CONNECTORS
- SEPARATE POWER AND FIBERS
- T-SPLITTERS IN EQUIPRESSURE

