Chicane Option with Copper Magnet
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Conductor: MgO-insulated hollow conductor (modeled on JHF conductor)

Magnet length: 50 m

Inner radius: 43 cm

Outer radius: Eight values, from 58.5 cm to 87.2 cm

Magnet mass: 145 tonnes to 479 tonnes

Unit cost of magnet: Either $200/kg or $400/kg

Cost of magnet: $29 M to $96 M @ $200/kg; twice that at $400/kg

Amortization rate: 10% per year

Amortization cost: 2.9-9.6 M$/yr @ $200/kg; twice that at $400/kg

Field strength: 1.5 T

Power: 82 MW at 145 tonnes; 33 MW @ 479 tonnes

Unit cost of power: 1 M$ per MW-yr (11.4 cents per kW-hr)

Duty cycle: 30% (Is this in the right ballpark?)

Yearly cost of power: 24 M$/yr at 82 MW; 10 M$/yr @ 33 MW

Minimum total yearly cost @ $200/kg: 19 M$/yr @ O.R. ~ 75-80 cm

Minimum total yearly cost @ $400/kg: 25 M$/yr @ O.R. ~ 70 cm

In order to keep the power consumption from being exorbitant, the resistive magnet is very massive and therefore expensive; the amortization cost is high. Even with a magnet of hundreds of tonnes, the power consumption is tens of megawatts; the running cost also is high. Therefore, the prospects are good that a superconducting magnet can be the more economical option.

Amortization & Running Cost of Hollow-Conductor Chicane Magnet