



MEA – MODIFIED ENERGY AMPLIFIER PROPOSAL

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Recently Rubbia et alii [1] proposed a conceptual design of an Accelerator Driven System, known as Energy Amplifier (EA), as an advanced innovative reactor which utilizes a spallation neutron source induced by protons, from a Cyclotron or Linac, in a subcritical array imbedded in liquid lead coolant. Besides of being breeder and waste burner, the conceptual design generates energy and allows the use of Thorium as fuel. This paper introduces some qualitative changes in the Rubbia's concept.

More than one point of spallation is proposed in order to reduce the requirement of proton energy and current of the accelerator, and mainly to make a flatter power density distribution. The subcritical core, which in the Rubbia's concept is an hexagonal array of pins immersed in a liquid lead coolant, is replaced by a concept of a solid lead calandria with the fuel elements in channels cooled by Helium.

This concept allows on line refueling or shuffling, and the utilization of a direct thermodynamic cycle (Brayton), which is more efficient than a vapor cycle. Although the calculations to demonstrate the feasibility of the MEA concept are underway and not yet finished, these ideas do not violate the basic physics of the EA, but reduces requirement in the accelerator complex, which is more realistic and economical in today accelerators technology.

Finally, the utilization of He as coolant, compared with liquid Pb, is more realistic since the gas cooled reactors technology is well established and more efficient from the thermodynamic view, allowing simplification and the utilization in high temperature process, like hydrogen generation.

[1] C. Rubbia, et alii: *Conceptual design of a fast neutron operated high power energy amplifier*. CERN/AT/95–44 (ET). 1995.