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Theoretical design of a compact energy recovering divertor D.A. BAVER, None — An energy recovering divertor (ERD) is a type of plasma direct converter (PDC) designed to fit in the divertor channel of a tokamak. Such a device reduces the heat load to the divertor plate by converting a portion of it into electrical energy. This recovered energy can then be used for auxiliary heating and current drive, fundamentally altering the relationship between scientific and engineering breakeven and reducing dependence on bootstrap current. Previous work on the ERD concept [1] focused on amplification of Alfven waves in a manner similar to a free-electron laser. While conceptually straightforward, this concept was also bulky, thus limiting its applicability to existing tokamak experiments. A design is presented for an ERD based on sheath-localized waves. This makes possible a device sufficiently compact to fit in the divertor channel of many existing tokamak experiments, and moreover requires no new shaping coils to achieve the desired magnetic geometry or topology. In addition, incidental advantages of this concept will be discussed.

[1] Journal of Fusion Energy 32, 278 (2013).

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None

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