

Abstract Submitted
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Alpha-Channeling in Mirror Machines ANDREY ZHMOGINOV, NATHANIEL FISCH, Princeton University — Linear magnetic trap is an attractive concept for fusion research and plasma applications due to its relative engineering simplicity and high-beta operation. Application of the alpha-channeling technique to mirror machines can benefit this concept by efficiently redirecting alpha particle energy to fuel ion heating or sustaining plasma confinement, thus increasing the effective fusion reactivity. To identify waves suitable for alpha-channeling a rough optimization of the energy extraction rate with respect to the wave parameters is performed. After the optimal regime is identified, the systematic search for modes with similar parameters in mirror plasmas is performed by assuming quasi-longitudinal, or quasi-transverse wave propagation. As a result, modes suitable for alpha particle energy extraction are identified in several device designs including the LAPD experiment. Under a proper choice of the tandem mirror device parameters, the predicted modes are expected to feed ICRH waves in the device plugs, thus redirecting the extracted energy to sustaining the plasma confinement.

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