Abstract Submitted
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Momentum-Exchange Current Drive, Alpha Channeling, and Rotation (PhD Oral-24)[1] IAN OCHS, NATHANIEL FISCH, Princeton University — The electric field associated with a planar electrostatic wave has no average momentum, and thus as the waves damp, the momentum of the plasma has to be conserved. We examine various implications of this momentum conservation. In the planar problem, we show how wave-mediated momentum exchange between non-resonant and resonant particles can drive net currents in spite of the constraint [1]. This momentum-exchange current drive can provide a possible magnetogenesis mechanism in astrophysical settings. Adding spatial wave structure, important for application to steady-state laboratory devices, introduces new momentum terms. We discuss the implications of our results for wave-mediated perpendicular momentum transport in magnetized plasmas with hot ion gradients, drawing analogies with collisional momentum transport in rotating ExB plasmas [2-4].
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