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Microinstabilities in quasi-helically symmetric stellarators¹ TARIQ RAFIQ, CHRIS HEGNA, University of Wisconsin — The linear stability of electron drift modes, dissipative trapped electron modes (DTEM) and ITG modes is investigated in the electrostatic limit using ballooning formalism. For all these modes, a shooting technique is used and WKB type boundary conditions are applied. The three-dimensional equilibria is calculated for a quasihelically symmetric (QHS) stellarator and a configuration whose symmetry is spoiled by the presence of mirror contribution to the magnetic spectrum. The dependence of the drift wave spectrum of stable and unstable modes, on various equilibrium parameters are investigated. The DTEM growth rate is calculated using perturbative approach. Multiple classes of helically-localized and toroidally-localized eigenfunctions in the ballooning space are taken into account. The helically trapped modes are found to be most destabilizing in the QHS configuration, while in the Mirror configuration the toroidally trapped modes are found unstable. The magnitude of the growth rate is found to be higher in the Mirror configuration except for cases with peaked density profiles.

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