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Alfvén mode structure/stability properties of stellarators and broken-symmetry tokamaks[1] DON SPONG, Oak Ridge National Laboratory — Energetic particle driven shear Alfvén wave (SAW) instabilities are frequently observed in both stellarator and tokamak experiments. Three-dimensional effects are present in all toroidal devices and can significantly influence both stability properties of energetic particle populations and their loss patterns on the first wall. Three-dimensional equilibrium variations in stellarators and broken symmetry tokamaks provide new couplings that increase the complexity and density of the Alfvén mode spectrum. An eigenmode solver, the AE3D code, has been developed for calculating Alfvén mode structures in such configurations and identifying the most likely modes for resonant energetic tail destabilization. Applications of this model to a variety of stellarators (LHD, TJ-II, HSX, QPS, NCSX) and broken symmetry tokamaks (ITER with TF ripple and ferritic materials) have been made and results will be presented. Possible extensions to include sound wave couplings and gyro-Landau closures will be discussed.

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