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Spectral Gap of Shear Alfvén Waves in a Periodic Array of Magnetic Mirrors[1] ROGER MCWILLIAMS, YANG ZHANG, WILLIAM HEIDBRINK, HEINZ BOEHMER, UC Irvine, GUANGYE CHEN, BORIS BREIZMAN, UT Austin, STEPHEN VINCENA, TROY CARTER, DAVID LENEMAN, WALTER GEKELMAN, BRIAN BRUGMAN, UCLA, UC IRVINE TEAM, UT AUSTIN COLLABORATION, UCLA COLLABORATION — A multiple magnetic mirror array is formed at the LArge Plasma Device (LAPD), to study axial periodicity-influenced Alfvén spectra. Shear Alfvén Waves (SAW) are launched by antennas inserted in the LAPD plasma. From radial wave field scans with B-dot probes at many axial locations, SAW standing-wave formation and wave refraction in mirror cell(s) are observed. Alfvén wave spectral gaps and continua are formed similar to wave propagation in other periodic media due to the Bragg effect. The width of the propagation gap scales with the modulation amplitude according to the solutions of Mathieu's equation. A 2-D finite-difference code modeling SAW in a mirror array configuration shows similar spectral features. Machine end-reflection conditions and damping mechanisms including electron-ion Coulomb collision and electron Landau damping are important for simulation.

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