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Radial Phase Shearing of Alfven Eigenmodes driven by Energetic Particles[1] GUOYONG FU, Princeton University — It is known that ideal MHD mode structure of Alfven eigenmodes such as TAE or RSAE has up-down symmetry for an up-down symmetric tokamak equilibrium. However, it has also been observed in many numerical simulations that such symmetry is broken for energetic particle-driven Alfven modes. The driven modes exhibit radial phase shearing of their 2D mode structure in a polodal plane. This radial phase shearing has clearly been observed by ECEI for beam-driven RSAE in the recent DIII-D experiments [1]. In this work, an analytic theory has been developed to show that energetic particle resonant drive can indeed break the ideal MHD symmetry and induce the radial phase shearing. Furthermore, the phase shearing is shown to be independent of the direction of plasma current. The phase shearing changes direction as the toroidal magnetic field is reversed. These analytic results agree with experimental observation as well as numerical simulations.

[1] B. J. Tobias *et al.*, Phys. Rev. Lett. **106**, 075003 (2011);

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