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Influence of a parallel magnetic field on the instability of a free shear layer at low magnetic Reynolds number ANATOLIY VOROBEV, OLEG ZIKANOV, University of Michigan - Dearborn — We analyze the effect of a constant parallel magnetic field on the temporal instability and transition to turbulence in a free shear layer. The case of low magnetic Reynolds numbers is considered. It is known that the magnetic field changes the instability characteristics. It suppresses the growth of the perturbations and, at sufficiently large magnetic interaction parameter, can result in the most unstable perturbations accepting three-dimensional form (rolls at an oblique angle to the flow direction). It is clear that the secondary instability of the developed rolls changes as well. In our work we summarize the results concerning the primary linear instability of the erf-mixing layer. We also investigate the development of the instability and transition to turbulence using the DNS approach. Influence of the magnetic fields of the different strengths is considered. Part of the work was performed during the MHD Summer Program - 2005 at the Universite Libre de Bruxelles, Belgium. Support from the DOE Office of Basic Energy Science and NSF-MRI program is appreciated.

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