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Electron transport due to global Alfvén eigenmodes in NSTX NIKOLAI GORELENKOV, PPPL, Princeton University, ALLEN BOOZER, Columbia University, ERIC FREDRICKSON, PPPL, Princeton University, DAN STUTMAN, John Hopkins University, ROSCOE. B. WHITE, PPPL, Princeton University — We inversigate theoretically and numerically the possible electron transport induced by multiple instabilities of Global Alfvén Eigenmodes (GAE) in a toroidal plasma. Such anomalous eletron transport was observed in NSTX recently when NBI power was increased to $P_{NBI} = 6MW$ in both H- and L-mode discharges. With the frequency range of 0.5 - 1MHz GAEs may resonantly interact with bulk (~ 1 - 2keV energy) primarily trapped electrons. Because of strong beam ion drive GAEs are not damped on electrons, but are excited to a strong amplitudes, $\delta n_e/n_e \sim 10^{-4}$. ORBIT simulations show that the overlap of electron phase space resonant structures due to multiple GAE instabilities may induce stochastic electron diffusion. Our calculations suggest that GAEs with observed amplitudes may lead to electron heat diffusivity, $\chi_e \geq 10m^2/sec$, comparable to those inferred from the power balance analysis. The above mechanism potentially could have significant implications for fusion.

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