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New MHD modes below the geodesic acoustic frequency and beam driven instabilities in NSTX[1] M.V. GORELENKOVA, TRINITI, Troitsk, Russia, N.N. GORELENKOV, E. FREDRICKSON, PPPL, Princeton University, H. BERK, IFS, Austin, Texas — We report on new global MHD eigenmode solutions which are found associated with the gap in the Alfvén/acoustic continuum. The modes are at frequencies below the geodesic acoustic modes (GAM). In contrast to the mostly electrostatic polarization of GAMs the new modes contain electromagnetic component due to the interaction with the Alfvén branch. Indeed a new continuum branch emerges with a modified shear Alfvén wave dispersion relation. The new modes associated with this shear Alfvén branch have phase velocity significantly above the background ion thermal velocity and thus are expected to be insensitive to kinetic effects. These new modes may be associated with so-called BAE modes that have been found (but not explained theoretically) in numerical MHD codes [A. Turnbull, et.al. Phys. Fluids **B 5** 2546 (1993)] and kinetic codes [N.N. Gorelenkov,et.al., Nucl.Fusion **42** (2002) 150]. We speculate that new modes are being driven by beam ions in NSTX at roughly half of the TAE frequency.

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