Kinetic Effects on Reversed Shear Alfvén Eigenmodes prior to ITB formation[1] NIKOLAI GORELENKOV, RAFFI NAZIKIAN, GERRIT KRAMER, PPPL, Princeton University — We consider one type of Alfvén Eigenmodes for a scenario of ITB formation when the safety factor minimum reaches its rational value. We develop a theory for the eigenmodes in this case sometimes known as either the bottom of the frequency sweep or the down sweeping Reversed Shear Alfvén Eigenmodes (RSAEs). The proper safety factor values for RSAE formation are achieved prior to ITB formation. First we show that, strictly speaking, the ideal MHD theory is not compatible with the eigenmode solution in the reversed shear plasma with q_{min} above rational values. Corrected by a special, analytic FLR condition, MHD dispersion of these modes nevertheless can be developed. Numerically, MHD component of the structure can serve as a good approximation for the RSAEs. The large radial scale part of the analytic RSAE solution can be obtained from ideal MHD and expressed in terms of the Legendre functions analytically. The kinetic equation for the eigenmode structure with the FLR effects is solved numerically and agrees with the analytic solutions. Ideal MHD code NOVA is used to varify its applicability and compatibility with such plasmas. Kinetic properties of RSAEs can be important and trigger the ITB formation.

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