



## **Nonlinear coupling of toroidal Alfvén eigenmode and reverse shear Alfvén eigenmode in Tokamak plasmas**

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In Tokamak plasmas, a variety of shear Alfvén wave (SAW) eigenmodes, such as the toroidal Alfvén eigenmode (TAE) and the reverse shear Alfvén eigenmode (RSAE), exist due to the equilibrium magnetic geometry. TAE is induced by toroidal coupling of neighboring poloidal harmonics, localizing between the two neighboring rational surfaces. On the other hand, RSAE localizes at the extreme value of the safety factor  $q$ . RSAE may couple to TAE during current ramping, as observed on DIII-D and HL-2A Tokamaks.

In this work, the nonlinear coupling of TAE and RSAE is investigated using gyrokinetic theory, where a TAE couples to a RSAE, and generates a geodesic acoustic mode (GAM). The expected results, may contribute to the understanding of SAW dynamics as well as energetic particles confinement in future burning plasma.

### References

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