

Abstract Submitted  
for the DPP19 Meeting of  
The American Physical Society

**The effect of species mix and fast-ion distribution on emission of fast magnetosonic waves near the ion cyclotron frequency**<sup>1</sup> S. VINCENA, UCLA, WW. HEIDBRINK, UCI, N. CROCKER, UCLA, G. DEGRANDCHAMP, UCI, X. DU, GA, M. KOEPKE, S. NOGAMI, WVU, S. SHARAPOV, CCFE, SX. TANG, UCLA, K. THOME, GA, SKP. TRIPATHI, UCLA, MA. VAN ZEELAND, GA — In the radiation belts, energetic ions drive wave emission both above and below the ion cyclotron frequency  $\omega_{ci}$ . In a Frontier Science experiment on the DIII-D tokamak, emission of fast magnetosonic waves near  $\omega_{ci}$  and its harmonics is investigated using systematic scans of species mix, magnetic field, and fast-ion distribution function. For most fast-ion populations, increasing  $H^+$  in a background  $D^+$  plasma increases emission below  $\omega_{ci}$  but decreases emission above  $\omega_{ci}$ , while lower magnetic field strength gives stronger emission below  $\omega_{ci}$  but has relatively little effect above  $\omega_{ci}$ . Addition of a third species ( $^3He^{++}$ ) sometimes introduces an additional emission band below  $\omega_{ci}$  reminiscent of the three electromagnetic ion cyclotron wave bands of  $H^+$ ,  $He^+$ , and  $O^+$  in space. For higher frequencies ( $\omega > \omega_{cH}$ ) fast magnetosonic waves with spectral peaks at multiples of  $\omega_{cH}$  have been observed by satellites in the equatorial magnetosphere. Similar spectra at harmonics of  $\omega_{ci}$  are observed in magnetically confined fusion plasmas. Comparisons of stability calculations used in both the space and fusion communities will be shown.

<sup>1</sup>Work supported by US DOE under DE-FC02-04ER54698

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Date submitted: 03 Jul 2019

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