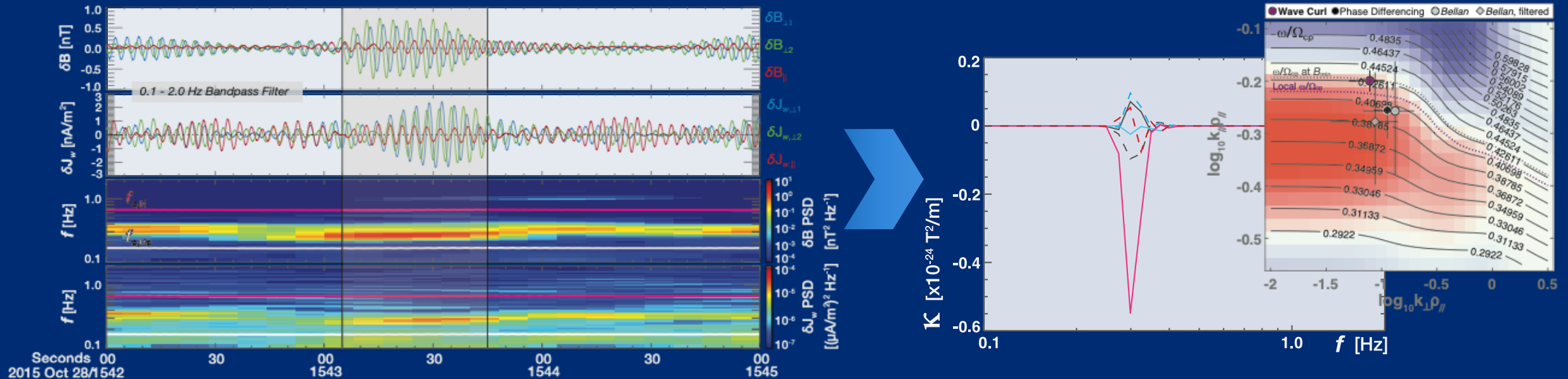


# The Wave Curl Analysis Revealing Fundamental Properties of EMIC Waves with Multi-Point Measurements

EMIC waves are important for many processes in the magnetosphere. But, *the wave vector,  $\mathbf{k}$* , is not well known observationally. **Because  $\mathbf{k}$  affects wave growth, propagation, and interactions with local plasma, determining  $\mathbf{k}$  is a key component in understanding the effects of these waves.**



- Using the 4 MMS satellites to get current density, we tested a new method for determining EMIC wave  $\mathbf{k}$  that applies Ampere's law to the complex wave fields.
- *With this method, we can fully determine the direction and magnitude of  $\mathbf{k}$ .*
- This method provides stable results and can handle user input variations.
- Our method agrees well with theoretical linear dispersion analysis, as well as with other methods for determining  $\mathbf{k}$ .
- **Our results give confidence that we can use this technique for future, large-scale studies to answer outstanding, fundamental questions involving  $\mathbf{k}$ .**



**A newly developed technique based on closely-spaced multi-spacecraft measurements can now unlock critical information missing from our understanding of EMIC waves.**