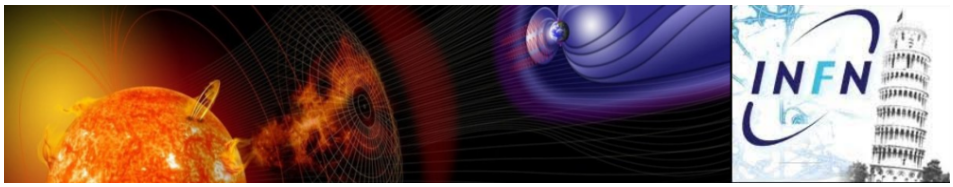

Contribution ID: **65** Type: **not specified**

Diagnosing temperature and density turbulence properties from type III fine structure

Thursday, 8 July 2021 19:27 (4 minutes)

The Sun frequently accelerates near-relativistic electron beams that travel out through the solar corona and interplanetary space. Undergoing wave-particle interactions with Langmuir waves, these beams are the driver for type III radio bursts, the brightest radio bursts produced by the Sun. The formation and motion of type III fine frequency structures is a puzzle but is commonly believed to be related to plasma turbulence in the solar corona and solar wind. Combining a theoretical framework with kinetic, wave-particle simulations and high-resolution radio type III observations, we quantitatively show that the fine structures are caused by the moving intense clumps of Langmuir waves in a turbulent medium. Our results show how type III fine structure can be used to remotely analyse the intensity and spectrum of compressive density fluctuations, and can infer ambient temperatures. This new plasma diagnostic for the solar corona and solar wind is at distances from the Sun where these properties normally cannot be measured, and significantly expands the current potential of solar radio emission.

Email

Primary authors: Dr REID, Hamish (University College London); Dr KONTAR, Eduard (University of Glasgow)

Presenter: Dr REID, Hamish (University College London)

Session Classification: Working Group 2: Particle acceleration

Track Classification: Working Group 2: Particle acceleration