



Contribution ID: 29

Type: **not specified**

## Cosmic Ray Electron Transport and Radiation in the Inner Heliophysics and RHESSI Observations of Hard X-ray emission from the Quiet Sun

*Thursday, 8 July 2021 18:00 (20 minutes)*

Hanna et al. (2010) show the 3-200 keV spectrum of the total Sun observed by RHESSI during the quiet phase of the Sun from 2005 to 2009. A possible source of this radiation could be synchrotron emission by Cosmic Ray Electrons (CRes). I will present results from a preliminary exploration of this model. Several near Earth instruments have observed CRe spectra at 1 AU during quiet and active phase of the Sun. The spectrum of the CRes at the Sun are not observed but can be evaluated by a detailed study of the transport of CRes from 1 AU to the solar photosphere. The transport is affected by three physical process; energy loss due to synchrotron and inverse Compton (IC), and the magnetic field convergence and scattering by the MHD turbulence in the solar wind. There are many observations and subsequent models for the structure of the magnetic field in the inner heliosphere which allow to address the first two processes fairly accurately. However, the third requires a knowledge of the energy density and spectrum of turbulence from 1 AU to the Sun. Up to recently these characteristics of the turbulence were measured around 1 AU, but Parker Solar Probe (PSP) has extended this knowledge to 0.17 AU. Extrapolating these observations to the Sun I will present result on transport of CRes using a novel and simple version of Fokker Planck equation. This will give us the spectral evolution of the CRes from 1 AU to the photosphere. The spectra at the photosphere can then be used to calculate the synchrotron spectrum and determine how well it reproduces the RHESSI observations.

### Email

vahep@stanford.edu

**Primary authors:** Prof. PETROSIAN, Vahe' (Stanford University); Dr ORLANDO, Elena (Università degli Studi di Trieste); Dr STRONG, Andy (Max Planck Institute for extraterrestrial Physics)

**Presenter:** Prof. PETROSIAN, Vahe' (Stanford University)

**Session Classification:** Working Group 3: Ion studies and Fermi/LAT

**Track Classification:** Working Group 3: Ion studies and Fermi/LAT