

Abstract Submitted
for the CUWIP22 Meeting of
The American Physical Society

Detector Development for the IMPulsive Phase Rapid Energetic Solar Spectrometer (IMPRESS) Collaborative Experiment¹ MISTY CHIEN, Dartmouth College — The IMPulsive Phase Rapid Energetic Solar Spectrometer (IMPRESS) is a CubeSat-based experiment for characterizing hard X-ray emissions from solar Pares. These solar Pares occur during magnetic reconnection events on the sun's atmosphere and release an enormous amount of energy in the form of non-thermal accelerating electrons. Previous studies revealed fast time variations in the x-ray Pux, but there were issues of signal pileup and other detector shortcomings (Kiplinger et al 1984; Qiu et al. 2012). IMPRESS seeks to further our knowledge in electron acceleration mechanisms by optimizing its detectors for temporal and energy resolution in order to effectively measure hard X-ray Pux from solar Pares. To accomplish this, the satellite implements an array of fast scintillators with silicon photomultiplier read out in conjunction with high-rate electronics and processing systems. Through calibration routines using radioactive sources and varying certain parameters in the data acquisition code, we show that we can optimize the detector to approach the desired temporal and energy resolution. Because IMPRESS is a collaborative project across institutions, the experiment offers a multitude of opportunities to involve students of all levels on the development effort.

¹This work is supported by the NSF-REU solar physics program at Montana State University-Bozeman, grant number AGS-1851822.

Misty Chien
Dartmouth College

Date submitted: 09 Jan 2022

Electronic form version 1.4