ELECTRON ACCELERATION IN SOLAR FLARES: X-RAY AND IN-SITU ELECTRON OBSERVATIONS

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X-ray observations reveal that solar flares are efficiently accelerating electrons up to relativistic energies. The acceleration mechanisms, however, are not understood. The observed X-ray emissions are produced by

collisions between flare-accelerated electrons and the ambient plasma (i.e. non-thermal bremsstrahlung emission). As the bremsstrahlung mechanism is well understood, X-ray observations provide excellent remote sensing diagnostics of electron acceleration in solar flares providing quantitative measurements such as spectral shape and energy content of flare-accelerated electrons. Further diagnostics are provided by in-situ particle observations in interplanetary space of electrons escaping the flare site allow us to directly measure flare-accelerated electrons.

After an extensive introduction, I will review recent observational results from the NASA small explorer mission RHESSI.