

Statistical study of release time and its energy dependence of in-situ energetic electrons in impulsive solar flares

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Using the Fraction Velocity Dispersion Analysis (FVDA) method, it has been shown recently in two impulsive SEP events, the release times of near-relativistic electrons at the Sun for outward propagating electrons are energy dependent and are delayed compared to those of the downward propagating electrons. Here we show the results from a statistical study of the release time and its energy dependence of near-relativistic electrons in impulsive SEE events. We use in-situ observations from the Wind spacecraft and remote hard X-ray observations from the RHESSI and/or Fermi spacecraft. The difference of the release times between outward electrons and downward electrons for 29 events are obtained. In all events the release of the outward propagating electrons are delayed from those precipitating downward. In 26 of the 29 events, the release times of outward propagating electrons also show clear energy dependence. In 15 of these 26 events, in-situ electron data from more than 5 energy channels were available. The delay time as a function of energy for these events can be fitted by a form proposed by Li et al. (2021). The implication of this energy dependent release on the MHD turbulence property at the electron acceleration site is discussed.

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1. Introduction

The content of this paper is now published at [1].

References

- [1] Wu, X., Li, G., Zhao, L., Effenberger, F., Wang, L., Yao, S. (2023). Statistical study of release time and its energy dependence of in situ energetic electrons in impulsive solar flares. *Journal of Geophysical Research: Space Physics*, 128, e2022JA030939. <https://doi.org/10.1029/2022JA030939>