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Three-dimensional forward-fit modeling of the hard X-ray and the microwave emissions of the 2015-06-22 M6.5 flare NATSUHA KURODA, DALE GARY, HAIMIN WANG, GREGORY FLEISHMAN, GELU NITA, JU JING, New Jersey Inst of Tech — The well-established notion of a "common population" of the flare-accelerated electrons simultaneously producing the hard X-ray (HXR) and the microwave (MW) emission has been challenged by some studies reporting the discrepancies between the HXR-inferred and the MW-inferred electron energy spectra. The traditional methods of their spectral inversion have some problems that can be mainly attributed to the unrealistic and the oversimplified treatment of the flare emission. To properly address this problem, we use a Non-linear Force Free Field model extrapolated from an observed photospheric magnetogram as input to the three-dimensional, multi-wavelength modeling platform GX Simulator, and create a unified electron population model that can simultaneously reproduce the observed HXR and MW observations. We model the end of the impulsive phase of the 2015-06-22 M6.5 flare, and constrain the model using observations made by the Reuven Ramaty High Energy Solar Spectroscopic Imager (HXR) and the Expanded Owens Valley Solar Array (MW). Our results reveal that an "HXR invisible" population of nonthermal electrons may be trapped in a large volume of magnetic field above the HXR-emitting loops, which is observable by its gyrosynchrotron radiation emitting mainly in MW low frequency range.

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